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MALARIA

Dow, R. P. **Notes on Iranian Mosquitoes.** *Amer. J. Trop. Med. & Hyg.* 1953, July, v. 2, No. 4, 683–95, 1 map.

In connexion with his studies in malaria control the author collected mosquitoes in western and central Persia (Iran) between August and November 1949. He visited 48 localities and obtained 21 species or varieties, 10 culicine and 11 anopheline. This paper contains entomological notes on the species.

The culicines were: *Aëdes aegypti* and *caspius*, *Culex hortensis*, *mimeticus*, *pipiens*, *quinquefasciatus* [*fatigans*], *theileri* and *tritaeniorhynchus*, *Culiseta longiareolata* and *Uranotaenia unguiculata*. The 11 anophelines were: *Anopheles claviger*, *hyrcanus pseudopictus*, *maculipennis*, *melanoon melanoon*, *melanoon subalpinus*, *sacharovi*, *culicifacies*, *dthali*, *pulcherrimus*, *stephensi* and *superpictus*.

The known and probable vectors of malaria in the west are *Anopheles sacharovi*, *maculipennis*, *superpictus*, *stephensi* and *culicifacies* and each was found resting in man-made shelters. In the dry regions of Azerbaijan and the Central plateau *superpictus*, *sacharovi* and *maculipennis* were concentrated in the villages.

In the south-west, *A. stephensi* was found in Abadan in buildings while at Bushehr, *A. culicifacies* occurred in dark, cool cisterns.

In the moist Caspian lowlands, *sacharovi* and *maculipennis* were abundant and definitely house-haunting but *superpictus* was seen to be a partially wild species.

So while most places in western Iran can be dealt with by residual insecticides or by engineering methods, there still remains the problem of the control of the wild *A. superpictus* in the humid areas. *H. S. Leeson*

Moores, H. **A Method for maintaining a Colony of** *Anopheles gambiae* **in the Laboratory.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1953, July, v. 47, No. 4, 321–3.

The strain of *A. gambiae* originated from wild-caught female mosquitoes taken at Kisumu, Kenya, and has been maintained for 3 years under laboratory conditions in Nairobi without replenishment from the field.

The adults are kept in cages, 12 in. × 10 in. × 10 in. and as many as 1,000 mosquitoes (presumably about equal sex-ratio) are kept in one cage.

The room in which they are kept is at a temperature of 85°F. and a relative humidity of about 90 per cent. Each lot of mosquitoes is offered a blood meal daily by the insertion of a dampened human forearm into the cage, which is covered by dark blue cloth during this procedure. A feeding period usually lasts for an hour. Between these periods, wool pads soaked in "Golden Syrup" diluted 8 times with water are provided in the cage. Eggs are laid about 3 days after the first blood meal. Pads of cotton wool soaked in water and covered by damp filter paper provide good oviposition sites and eliminate losses of adults by drowning. Hatching rates are best if eggs are thus stored for 24–60 hours before transfer to water.

Larvae are reared in a medium of sodium chloride (0·5 gm.), plaster of Paris (0·5 gm.), magnesium sulphate (1·0 gm.) and distilled water (1 litre) at a *p*H of 8 (Bate's formula) in white enamel bowls 9½ in. diameter by 1 in. deep. About 750 cc. of the rearing fluid is put in each bowl and the number of larvae is kept to 50–70 per bowl. Larval food consists of about 15–50 mgm. (increasing dosage with larval growth) of a mixture of "Bemax" and of "Oxoid" brand desiccated heart daily with, also, approximately 10 mgm. DCL yeast for newly hatched larvae and 30 mgm. towards the end of the larval period. Thrice per week, 0·5 to 1 cc. of a 1 per cent. solution of "Oxoid" liver extract is added. The larval period lasts about 8 days. If scum forms on the surface of the rearing dishes, the larvae are transferred to a new bowl of fresh medium. *D. S. Bertram*

Sommerman, K. M. & Foote, R. H. **Pictorial Keys to the Mosquitoes of Medical Importance. III. Malaya.** *Mosquito News.* 1953, June, v. 13, No. 2, 162–4, 2 figs.

This article provides pictorial charts of the diagnostic features of the adult female and larva of *Anopheles umbrosus*, *A. letifer*, *A. barbirostris*, *A. hyrcanus nigerrimus*, *A. hyrcanus sinensis*, *A. minimus*, *A. sundaicus*, *A. maculatus* and of *Aëdes aegypti* and *Aëdes albopictus*. The anophelines are variously concerned with malaria transmission and the 2 culicine mosquitoes with dengue. Brief notes are given of the principal breeding habits of these species. It is an article intended for the use of public health workers. *D. S. Bertram*

Rozeboom, L. E. **Sexual Isolation in some North American *Anopheles* Mosquitoes.** *Amer. J. Trop. Med. & Hyg.* 1953, July, v. 2, No. 4, 677–82.

The results of mating experiments between *Anopheles quadrimaculatus*, *A. freeborni* and *A. aztecus*, in various combinations, indicate that sexual isolation was probably not the primary cause of separation into species but may have become the means of keeping present-day populations separate in places where their ranges overlap.

Colonies of *A. quadrimaculatus*, *A. freeborni* and *A. aztecus* were maintained under optimum laboratory conditions, the sexes were separated in the pupal stage and kept separately until placed in the breeding cages. Where 2 species of adult females were mixed in one cage they were marked with bronze or aluminium dust. The dusts did not affect the mating activity.

The species combinations were set up in the following way and females were dissected to determine whether they had been fertilized:

A. quadrimaculatus/A. freeborni: 25 female *quadrimaculatus*, 25 female *freeborni*, 25 male *freeborni*. In another cage were placed 25 female *quadrimaculatus*, 25 female *freeborni*, 25 male *quadrimaculatus*, and similarly for the *A. quadrimaculatus/A. aztecus* and *A. aztecus/A. freeborni* crosses. With this 1:2 sex ratio 50 per cent. fertilization of the females was obtained.

A. quadrimaculatus males showed a marked preference for females of their own species and only fertilized a few *freeborni* females: large numbers of both these species of females were fertilized by *freeborni* males, but again these males fertilized a significantly higher proportion of their own species of females.

In the *aztecus/quadrimaculatus* combination few *quadrimaculatus* females were fertilized by *aztecus* males and *quadrimaculatus* males again fertilized a significantly greater number of their own females. The *aztecus/freeborni* cross showed that *aztecus* males fertilized a significantly greater number of their own females, but that *freeborni* males fertilized 64·4 per cent. female *aztecus* and 57·0 per cent. of their own females, probably because of the greater activity of the female *aztecus*.

Experiments where males of one species were caged with females of another species show that, even where no choice is possible, a barrier to cross-mating still exists. Approximately the same numbers of *aztecus* and *freeborni* females were fertilized by *freeborni* males in both types of experiment. *A. quadrimaculatus* males fertilized more *aztecus* than *freeborni* females, but *aztecus* males fertilized slightly larger numbers of *freeborni* than *quadrimaculatus* females.

It would appear that cross-mating experiments between these 3 species support taxonomic evidence in relating *A. aztecus* and *A. freeborni* more closely to each other than to *A. quadrimaculatus*. *Anne Hudson*

Lima, M. M. Do diagnóstico diferencial entre o *Anopheles* (*Kerteszia*) *cruzii* e o *Anopheles* (*Kerteszia*) *homunculus* na fase larvária. [**Differentiation Between** *Anopheles* **(K)** *cruzii* **and** *Anopheles* **(K)** *homunculus* **in the Larval Stages**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1952, Oct., v. 4, No. 4, 401–11, 4 coloured figs. on 4 pls.

The English summary appended to the paper is as follows:—

"The author working with material of Brusque (Santa Caterina) found the following constant differences between larvae of *Anopheles* (*Kerteszia*) *cruzii* and *Anopheles* (*Kerteszia*) *homunculus*:

A (*K*) *cruzii*
a.—anal segment little chitinized
b.—yellowish or reddish larvae
A (*K*) *homunculus*
a.—anal segment well chitinized
b.—dark larvae."

Paulini, E. Estudos sôbre a análise e a estabilidade da cloroquina. [**Analysis of the Stability of Chloraquine**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1953, Jan., v. 5, No. 1, 49–54.

The English summary appended to the paper is as follows:—

"The author has reviewed and studied the qualitative and quantitative analysis of chloroquine.

"The chemical stability of the drug was investigated both in mixtures with table salt and in aqueous solution. The solution of the drug was

heated for 3–4 hours at 100°C, at pH 4–7. None of the experiments has shown any appreciable degree of decomposition of the drug, which was found to be stable for use in mixtures with salt."

Covell, G., Shute, P. G. & Maryon, M. **Pyrimethamine ("Daraprim") in the Treatment of Vivax Malaria.** *Brit. Med. J.* 1953, Aug. 1, 258–9, 1 chart.

Investigations were undertaken to test the theory that pyrimethamine might effect a radical cure of *P. vivax* malaria by destroying late exo-erythrocytic forms of the parasite. The parasite used was the Madagascar strain employed at the Malaria Laboratory, Horton, for many years in the treatment of neuro-syphilis. Twelve patients suffering from mosquito-induced *P. vivax* malaria were treated with 50 mgm. pyrimethamine daily for 5 days. The clinical response to the action of the drug was very slow and for that reason the authors regard it as unsuitable for the treatment of the clinical attack in non-immune subjects. Four of the patients relapsed between the 55th and 99th days after completing the course, one of them on 2 occasions. On the 99th day, 11 of the patients were given a single dose of 25 mgm. of pyrimethamine which was repeated at weekly intervals for the following 7 weeks. All of them relapsed on one or more occasions between the 8th and 18th weeks after completing the 8-weeks course. There was no indication that either of the 2 courses of pyrimethamine given in this trial were of any value in preventing the incidence of relapses.

G. R. McRobert

Boyd, J. S. K. **Treatment of Acute Malaria.** [Correspondence.] *Brit. Med. J.* 1953, Aug. 15, 392.

Boyd gives a possible explanation of the discrepancy between the results obtained by Covell *et al.* with pyrimethamine against the Madagascar strain of *P. vivax* [above] and Coatney's results in the case of the Chesson strain. Pyrimethamine like proguanil acts on the asexual forms of the parasite in the blood stream at the time of nuclear division. If pyrimethamine does destroy the exo-erythrocytic forms of the parasite it probably does so by interfering with nuclear division. The Chesson strain of *P. vivax* is an "early-relapsing" race of the parasite. By giving pyrimethamine over a period of 8–10 weeks an effective concentration of the drug is ensured when the exo-erythrocytic forms reach the vulnerable stage of nuclear division prior to producing erythrocyte-invading forms. Hence Coatney's success in producing "suppressive cure". As the Madagascar strain remains latent up to 40 weeks with no indication of active division of the liver-cell forms during that period, pyrimethamine given during that time would have no effect, and the disease would relapse as Covell found. If further evidence confirms that pyrimethamine destroys exo-erythrocytic forms it will, when taken prophylactically, prevent late relapses of benign tertian malaria. Five references are given with this important letter.

G. R. McRobert

Covell, G. **Current Research toward a Global Control of Malaria.** *New England J. of Med.* 1953, July 23, v. 249, No. 4, 125–31.

This paper represents the Cutter lecture on Preventive Medicine, delivered by the author at the Harvard School of Public Health in May, 1953.

Sir Gordon Covell opens his address with a chronological account of work on the life cycle of the malaria parasite, tracing it from the original findings of LAVERAN to the recent demonstration of the tissue phase of the human plasmodia by SHORTT and his team. The author adds that the existence of a pre-erythrocytic phase in *P. falciparum* has recently been confirmed by the work of Martin YOUNG and his colleagues at the Laboratory of Tropical Diseases, Columbia, South Carolina.

The development of antimalarial drugs is next traced and mention is made of the search for synthetic antimalarials by the German workers between the wars and subsequently by American and British workers. The author points out that to understand the action of these drugs, they must be considered in relation to the various phases of the life cycle of the parasite, and he elaborates this in a short but useful discussion of the action of the different groups of antimalarial drugs. The mode of action is set out in a valuable table which, slightly modified for brevity, is included below:

MODE OF ACTION OF ANTIMALARIAL DRUGS

Class of Drug	*Primary Tissue Phase*	*Erythrocytic Phase*		*Secondary Tissue Phase*	*Mosquito Phase*
		Asexual Forms	*Sexual Forms*		
Cinchona alkaloids—quinine, etc.	–	EA	–	–	–
9-Aminoacridines—mepacrine, etc.	–	EA	–	–	–
4-Aminoquinolines—chloroquine, camoquin, etc.	–	EA	–	–	–
8-Aminoquinolines—pamaquine, primaquine, etc.	NE*	NE*	EA	EA	–
Biguanides—proguanil (Paludrine), etc.	EA†	TS	–	–	EA
2-4-diaminopyrimidines-pyrimethamine (daraprim), etc.	EA†	TS	–	–	EA

EA = Effective Action: NE = Not effective for this purpose: TS = Action too slow for treatment of clinical attack.

* Except in dangerously high dosage.

† Fully effective for this purpose only in *falciparum* malaria.

The relative usefulness of different drugs in treatment and prophylaxis and the question of drug resistance are touched upon.

There is an excellent summary of researches on insecticides, beginning with paris green and pyrethrum sprays and leading up to the residual insecticides. Reference is made to the question of the relative properties of solutions, emulsions and wettable powders, the importance of crystal size and of surfaces treated.

The author stresses the importance of studies on mosquito bionomics and particularly of resting places. Insecticide resistance is discussed and its practical importance and implications pointed out. The paper ends with a brief reference to the physiological approach to malaria and the studies now being undertaken in the Liverpool and London Schools of Tropical Medicine.

For those not familiar with the literature on malaria research this paper will be a very valuable compendium, while for others specially interested it will prove a useful and very readable *aide-mémoire*.

H. J. O'D. Burke-Gaffney

Thomas, A. T. G., Robertson, G. I. & Davey, D. G. **Experiments with Antimalarial Drugs in Man. I. The Protective Effect of Proguanil ("Paludrine") against an East African Strain of *Plasmodium falciparum* transmitted by *Anopheles gambiae*.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1953, July, v. 47, No. 4, 338–45, 4 charts.

The object of the investigations described in this paper was to evaluate the protection afforded by proguanil to subjects repeatedly exposed to infection with *Plasmodium falciparum*. The tests were carried out in Nairobi, Kenya, and the subjects were African volunteers from tribes normally resident in areas where malaria is either absent or is endemic in small degree only. Blood smears were taken daily for several weeks before the test commenced, and at the end of the experiment susceptibility tests were made on those who had taken part.

Thirty-five volunteers were arranged in groups as follows:

Group 1. Five volunteers received 1 tablet of 0·1 gm. daily.

Group 2. Ten volunteers received 0·1 gm. twice weekly.

Group 3. Ten volunteers received 0·3 gm. once weekly and were bitten every day if possible including the day on which the drug was given.

Group 4. Ten volunteers received 0·3 gm. once weekly and were bitten every day if possible except that on which the drug was given.

Infection was by the bites of heavily infected *Anopheles gambiae* from an insectary colony maintained at Nairobi. Except in Group 3, exposure commenced on the day after the first dose of the drug was given and was repeated almost daily for the next 2 months.

There were 2 apparent break-throughs, one in Group 2 (0·1 gm. twice weekly) and one in Group 4 (0·3 gm. weekly). Investigation showed that the first had almost certainly evaded taking the drug. The second may have been an example of proguanil acting only as a suppressive at this dosage. For the remaining 33 protection was apparently complete.

Susceptibility tests showed that one of the subjects was immune and 3 had a considerable degree of immunity, while in 2 others it was not possible to carry out the test. There remained 27 volunteers in whom susceptibility was proved beyond doubt, and who were completely protected.

G. Covell

Field, J. W., Strahan, J. H., Edeson, J. F. B. & Wilson, T. **Studies on the Chemotherapy of Malaria. I. The Suppression of Malaria by Synthetic Drugs.** *Med. J. Malaya.* 1952, Dec., v. 7, No. 2, 67–89, 15 figs.

This paper from the Malaria Research Division, Institute for Medical Research, Federation of Malaya, summarizes the results of studies on the suppression of malaria by synthetic drugs. Such studies began 25 years ago, and, in spite of interruptions in the work due to the Japanese invasion and due to banditry, studies are reported here on the effects of giving mepacrine in doses of 0·3 gm. once a week; proguanil in doses of 0·1 gm., 0·2 gm., 0·25 gm. and 0·3 gm. once a week; chloroquine in doses of 0·25 gm. once a week; and amodiaquin [camoquin] in doses of 0·4 gm. base once a month.

The populations upon whom the studies were made were labourers and their families—Tamils, Malays, and Javanese, on 3 estates in Selangor, and Negri Sembilan, Federation of Malaya, between December, 1946, and February, 1949. Each population was divided into 3 comparable sections,

2 of which received test drugs, while the third received a placebo and so formed a control group. Drugs were issued under the supervision of a Malaria Research Officer. Those people who developed fever were supervised and treated by a hospital assistant resident on each estate. Thick blood films from such patients were studied. Parasite and spleen surveys were done every 3 months. Malaria transmission was assessed by the incidence of malaria in unprotected infants, who were not given suppressive drugs until after their first attack; and by the results of mosquito dissections. The commonest vectors were *A. letifer*, *A. maculatus* and *A. umbrosus*.

The results of the tests of suppressive drugs are shown in a series of tables, charts, and diagrams. Malarial transmission was considered light during the period of these trials. Chloroquine 0·25 gm. base once weekly proved the most effective drug in suppressing malarial attacks. There was little difference between proguanil in various doses, or between proguanil and mepacrine, but these two drugs were much cheaper than chloroquine or amodiaquin. All the drugs reduced the parasite and spleen rates. No significant toxic symptoms were observed with any of the drugs used.

S. Bell

Jelliffe, D. B. & Onwumere, R. E. **Malarial Chemoprophylaxis and Weight Gain in West African Infants.** *J. Trop. Med. & Hyg.* 1953, Aug., v. 56, No. 8, 187–9. [12 refs.]

It is commonly observed that African babies gain weight normally from birth to about 6 months but that thereafter their growth is retarded as judged by Caucasian standards [this *Bulletin*, 1949, v. 46, 768; 1952, v. 49, 297]. To assess the part played by malaria in this falling off in weight, a clinical trial was undertaken in a hyperendemic area.

Thirty-five Yoruba (Nigeria) babies aged 7–10 months were weighed weekly for 6 months. At the beginning of the third month all were given intramuscular chloroquine (5 mgm. per kg.) once and then 50 mgm. proguanil daily for 2 months. In the last 2 months of the trial the babies received only dummy tablets. The 26 babies attending for the whole period showed average weekly weight-gains of (a) 1·96 ounces in the 2 months before starting prophylaxis, (b) 2·80 ounces in the 2 months of prophylaxis, and (c) 1·50 ounces in the last 2 months. The difference in the rate of weight-gain in the period during which malaria was suppressed is considered to be only just significant and it is tentatively concluded that, in the conditions prevailing at Ibadan, malaria is not the main factor interfering with the growth of babies at this age.

Dean A. Smith

See also p. 1169, Ludvik, **Topical Application of Insecticide Solutions to *Anopheles quadrimaculatus*.**

Bray, R. S. & Garnham, P. C. C. **Effect of Milk Diet on *P. cynomolgi* Infections in Monkeys.** *Brit. Med. J.* 1953, May 30, 1200–201, 2 figs.

The study described in this paper was undertaken to ascertain whether a milk diet given to monkeys infected with *Plasmodium cynomolgi* had the same effect on the course of the disease as in the case of rats infected with *P. berghei*, as reported by Maegraith *et al.* [this *Bulletin*, 1953, v. 50, 384].

The rhesus monkeys used in these experiments were placed on a milk diet (1–1½ pints daily with the addition of 5 mgm. vitamin B_1, 5 mgm. vitamin B_6 and 50 mgm. calcium pantothenate per litre of milk) two days before the inoculation of *P. cynomolgi*, the infection being blood-induced in 2 monkeys (one of which was later splenectomized), and sporozoite-induced (with suspensions of ground salivary glands from infected *Anopheles maculipennis atroparvus*) in 2 others. In both sets the animals were returned to their normal diet after periods varying from 19 to 26 days. The course of parasitaemia was followed by daily examination of stained blood films, while the exo-erythrocytic development of the parasites in a sporozoite-infected monkey was observed in sections of a sample of liver obtained by biopsy. The effect of the milk diet on sporogony was observed in mosquitoes fed on a blood-infected monkey 12 days after the infection, when gametocytes were present in its blood.

In all the monkeys the milk diet had a more or less marked suppressive effect upon the parasitaemia, which was at a much lower level than in monkeys kept on a normal diet. When the experimental monkeys were returned to their normal diet, there were recrudescences of the infection, and superfection with the homologous strain in one case produced heavy parasitaemia, indicating absence of premunition. As regards the pre-erythrocytic and sporogony stages, they proceeded normally, unaffected by the milk diet. *C. A. Hoare*

Hawking, F. **Milk Diet, *p*-Aminobenzoic Acid, and Malaria (*P. berghei*). Preliminary Communication.** *Brit. Med. J.* 1953, May 30, 1201–2.

A consideration of the work of Maegraith *et al.* [this *Bulletin*, 1953, v. 50, 384] on the suppressive effect of a milk diet on infections of rats with *Plasmodium berghei* has led the author to postulate that this effect might be due to the paucity of *p*-aminobenzoic acid (PAB) in milk, in contrast to its abundance in the normal laboratory diet. Moreover, it is known that PAB promotes the growth of *Plasmodium* in culture [this *Bulletin*, 1947, v. 44, 1043], and that malaria parasites (including *P. berghei*) are sensitive to sulphonamides, which inhibit the utilization of PAB.

To test this hypothesis the author carried out experiments with rats infected with *P. berghei* and fed on (a) normal diet, (b) milk diet, and (c) milk to which PAB 1/1,000 was added. It was found that the addition of PAB to the milk caused the infection to develop its usual course, the inadequacy of a purely milk diet being corrected by PAB, which is regarded as an essential metabolite for *P. berghei*. The investigation continues, but it is added that PAB was also found to correct the inadequacy of a milk diet in monkeys infected with *P. cynomolgi*. *C. A. Hoare*

Greenberg, J. **Reversal of the Activity of Chlorguanide against *Plasmodium gallinaceum* by Free or Conjugated *p*-Aminobenzoic Acid.** *Exper. Parasit.* New York. 1953, July, v. 2, No. 3, 271–9, 3 figs. [14 refs.]

Investigation has shown that the mode of action of chlorguanide [proguanil] is related to that of sulphonamides, and synergism has been demonstrated between the former and sulphadiazine against *P. gallinaceum* [this *Bulletin*, 1949, v. 46, 119]. The present author [*ibid.*, 1950, v. 47, 214] has also shown that antimalarials inhibited by *p*-aminobenzoic acid

increase the activity of chlorguanide. In this investigation he has attempted to inhibit the antimalarial activity of chlorguanide against *P. gallinaceum* with 23 different substances including purines, pyrimidines, nucleic acids, pterins, citrovorum factor (5-formyl-5:6:7:8-tetrahydrofolic acid) and certain components of the folic acid molecule. Of these substances only pteroylglutamic acid, calcium leucovorin (synthetic citrovorum factor), *p*-aminobenzoic acid and *p*-aminobenzoylglutamic acid could bring about reversal of activity to a limited extent. *J. D. Fulton*

Thurston, June P. *Plasmodium berghei. Exper. Parasit.* New York. 1953, July, v. 2, No 3, 311–32. [Numerous refs.]

TRYPANOSOMIASIS

Hutchinson, M. P. **The Epidemiology of Human Trypanosomiasis in British West Africa. I.—The Gambia, with special reference to Upper River Division.** *Ann. Trop. Med. & Parasit.* 1953, June, v. 47, No. 2, 156–68, 3 maps. **II.—The Gambia.** *Ibid.*, 169–82, 6 figs. on 2 pls.

I. The first of these papers deals with the epidemiology of the disease in the Upper River Division of the Gambia, based on the examination of some 45,000 persons and a study of the factors involved in transmission. Only 3 species of tsetse are known to occur, *Glossina palpalis*, *G. morsitans* and *G. longipalpis*, of which the first is widely distributed except on the plateau, and is believed to be the sole vector of *Trypanosoma gambiense*. A high rate of infection is found in certain villages, a low endemic level along the main river valley and only occasional cases in the plateau villages. The areas of high endemicity are in the Upper River Division in the region of side creeks containing perennial fresh water which are foci of concentration and survival of *G. palpalis*. There are 8 such creeks, of which only 3 were associated with high infection rates, the others for various reasons affording only interrupted fly-man contact. During the severe dry season on these 3 creeks fly-man contact is exceptionally close during the period of maximum concentration where the people frequent permanent pools for washing and bathing. The contact is defined as "personal" and sustained because the same fly population is living on the same group of people, and it reaches its maximum at the beginning of the rice-farming season. Rice farming is largely confined to women in the Gambia, and hence in villages outside the range of *G. palpalis* infection occurs mainly in women and older girls who make close personal contact with fly while working on their farms early in the rains. The incidence of infection drops abruptly in villages more than a mile from the fly focus. Along the main river, on the other hand, villages have to be situated on rising ground away from the river owing to the risk of flooding and therefore are at a distance from fly foci. In these villages the incidence is low because contact with *Glossina* is restricted to the latter part of the wet season when the fly is dispersing and contact is thus "impersonal" and interrupted [the term "impersonal" is used throughout; it appears to mean that a single community of fly does not feed on only one group of human hosts but ranges from group to group].

II. In the second paper, after review of the evidence afforded by surveys carried out since 1903, including spot surveys carried out by the author in

representative areas, the conclusion is reached that after an exacerbation during the decade 1925–35 human trypanosomiasis has again reached a natural balance in the community. Differences in the epidemiological pattern of the disease are associated with the 3 main topographical divisions of the country, *viz.*—the fresh-water region, the river-flats region and the maritime region. The fresh-water region has been dealt with in the first paper. The river-flats region reaches from 120 miles up-river to within 30 miles of the sea and in this stretch the river edge is bordered by mangroves which provide a permanent habitat for the fly; behind the mangroves are marsh and open river flats. The villages are built back from the river on the edge of rising ground and trypanosomiasis is absent from most of them. The bare river flats act as a natural barrier to movement of fly from the mangrove belt except at the end of the rains when high humidity facilitates dispersal and then contact with man is " impersonal " and interrupted. Near some villages oil palms fringing the flats harbour fly permanently and transmission occurs. Farming activities are tending to remove this vegetation and with it the fly.

In the maritime region saline creeks communicate with fresh-water swamps surrounded by oil palm and forest thicket which is permanently inhabited by *G. palpalis*. Villages in the vicinity show a moderate incidence of sleeping sickness which is 5 times as high among females as males owing to their seasonal preoccupation with rice farming. Elsewhere in this region trypanosomiasis is widely distributed with a low incidence as a result of frequent but " impersonal " contact with fly which roam widely in the humid atmosphere. Clearing of new farm land because of increasing population density is steadily restricting fly movement.

These studies show that in the Gambia the incidence and intensity of infection are determined by the type and duration of contact between man and *G. palpalis*. " Impersonal ", occasional or interrupted contact causes a low level of incidence even when fly is prevalent, while " personal ", intimate and sustained contacts cause a high incidence even where fly are not numerous. Circumstances limiting fly-man contact are the siting of villages back from the riverine fly foci, the ubiquity of wells, the absence of a fishing industry and the rarity of canoe travel. The bearing of the findings of this investigation on control is studied and suggestions are made for the elimination of foci of high endemicity by bush clearance in the fresh-water and river-flats regions and by mass chemotherapy in the maritime region.

T. H. Davey

Nash, T. A. M. & Page, W. A. **The Ecology of *Glossina palpalis* in Northern Nigeria.** *Trans. Roy. Entom. Soc. of London.* 1953, June 10, v. 104, Pt. 5, 71–169, 15 text figs. & 14 figs. on 7 pls. [31 refs.]

From 1944 to 1951 field researches on the ecology of *Glossina palpalis* were carried out at Katabu, Nigeria, which stands 2,000 ft. above sea-level in undulating savannah woodland traversed by streams lined along their banks with fringing forest. The fly is largely restricted to the fringing forest which may be as narrow as 5 yards. The activity of the tsetse was studied systematically in 5 fly-rounds on the Bahago stream. Flies were marked with paints to give, on recapture, indications of age and flight movements. Meteorological records were kept of microclimatic conditions in the forest and adjacent woodland savannah at heights of 4 in. and 4 ft. above ground. A botanical survey of the forest was made but the author

finds that the general configuration and not detailed botanical speciation of the elements of the forest vegetation suffices to understand the relationship of the fly to its environment during the year.

There is a marked wet season (April to October) in this territory which is close to the northern limit of the fly's distribution. The *early dry season* (November to January) has cold nights and hot days with a mean temperature of 22°C. It is the season of the desiccating Harmattan wind and evaporation rates are high. The *late dry season* (February to March) is the testing time for the tsetse which have to contend with temperatures rising to 39·4°C. combined with very high evaporation rates associated with relative humidities as low as 10–15 per cent. In the *early rains*, temperatures moderate to a mean monthly value of 27·5°C. and humidity increases. Day and night are hot and humid. From June to September, the season of *heavy* rains, the mean monthly temperature drops to 24·4°C. and the air is very moist (relative humidity about 90 per cent.). Rains cease abruptly in October.

The meteorological records demonstrate that the forest fringe is more equable than the open savannah and that appreciable differences in microclimate at 4 in. and 4 ft. in the forest are apparent only in very dry seasons when, before the next rains, favourable temperatures and humidity for survival of flies occur close only to permanent residual pools in well-shaded, sheltered parts of the stream-bed. In such foci dense growths of climbers and creepers on the forest trees provide lateral and overhead protection from wind and sun; high banks are a further protection against the drying effects of winds. It is to such foci that flies concentrate as the dry season continues. With the onset of the rains in April they disperse to less sheltered parts of the river and, by August and September, the fly population along the entire fringing forest is increased as a result of a greater reproductive rate and a greater longevity during the favourable climatic conditions of the rains. The increase may be as much as 13-fold. Following a season of poor rains, fly concentration in the late dry season is extreme but if heavy rains have prevailed for one or more years some flies are able to persist outside the limits of the most dense parts of the fringing forest in the intervening dry seasons. During the season of fly dispersal, flights of 1,000 yards within 24 hours were recorded with a maximum record of 3 miles along the forest fringe. Flies have crossed the woodland savannah between streams about 1 mile apart.

It is estimated that ♀♀ live 6–15 weeks and ♂♂ for 4–8 weeks with the highest expectation of life in the early and late rains. Females tolerate dryness and high temperatures better than males; flies between 10 and 50 days old are more resistant to adversity than younger or older individuals; flies experiencing severe climatic conditions when young tolerate dry conditions later in life more successfully than flies always accustomed to mild conditions. Extermination of flies begins when mean maximum temperatures over 10 days reach 34–35°C.

Breeding is directly related to temperature, a mean monthly temperature of 22·8°C. being the critical level above and below which increases and declines in population become evident. There is a lag of about 2 months before the temperature effect is apparent in the density of the fly. Mean monthly saturation deficiencies above 7 mm. or below 1·5 mm. lead to decreases in tsetse numbers.

Pupal collections showed, anomalously, maximum numbers in the early dry season with the period of maximum fly density in the rains seeming to coincide with a virtual absence of fresh puparia. It is concluded that satisfactory sampling for puparia is unattainable in the rains as they are so widely

dispersed throughout the fringing forest. With the onset of the dry-season fly, and their puparia, begin to concentrate towards the stream bed where puparia are not only more readily located because of concentration but more easily detected in the drying soil. A later fall in pupal numbers in the late dry-season is real; few flies remain to produce them. There is little evidence of appreciable breeding in the savannah woodland. Mean monthly temperatures of pupal sites ranged from 18·3°C. to 24·4°C., with mean maximum and minimum temperatures of 30·3°C. and 13·9°C. respectively.

Abnormal weather in one year severely modified the usual seasonal cycle in fly density. Although good numbers of fly survived the exacting conditions of the dry season, the usual increasing density did not follow as expected with the rains. The explanation appears to rest in abnormal storms in the early rains which washed away large numbers of puparia. Later, further storms alternated with unusually dry periods resulting in particularly adverse conditions of alternating desiccation and flooding at a season usually favourable to fly increase and survival.

Medium and large animals are not essential for blood-meals. Monitor lizards, baboon, monkey, duiker, cattle (seasonally), and some harnessed antelope were the most frequently observed animals. Warthog, roan, waterbuck and man were infrequent.

Of 3,382 male flies (from elsewhere than the experimental fly-rounds) dissected over 21 months, 91 were infected with *T. vivax* and a few with *T. congolense*, and trypanosomes of the *brucei-gambiense* group. The peak of fly infections (August and September) seemed to be due to good survival rates in the fly rather than to the influence of temperature on the flies directly or on them in the pupal stage. Both these factors are discussed in the paper and their importance as factors in fly infection are not disregarded.

In considering the transmission of trypanosomiasis it is reasoned that in years of severe drought man-fly contact in village areas is likely to be most frequent at the residual pools in the late dry season and early rains when these are the only sources of water to man. As the flies disperse with the rains transmission will become more widespread along the river-system. In mild years when rains have been sufficient to keep village wells stocked with water throughout the dry season there may be no transmission of human trypanosomiasis in the absence of an intimate man-fly contact at the residual pools. On the other hand, cattle trypanosomiasis is likely to be transmitted more effectively during years of heavy rains when the fly continues to be fairly well-distributed along the river system for most of the year, including the early and late rains when seasonal migrations of Fulani cattle take place in this territory. The greater potential in fly survival during these seasons of mild years may increase their infection rate and the risk of infection to the cattle.

Control is discussed. Regeneration of partial clearings is now a problem of serious magnitude in Nigeria. The present work suggests that felling only creeper- and climber-laden trees of permanent dry-season foci may be completely effective with a great saving of time and labour. The name "obstructive clearing" is proposed for this method. It should be done in the late dry-season and continued into the rains. In this way, the small dry-season population of fly would be attacked and its multiplication and dispersal in the rains restricted. The following dry season may witness the elimination of the surviving flies in the absence of the essential permanent foci.

The observations and records on which the authors found so much interesting interpretation of cause and effect are amply presented in

numerous figures and tables. The photographs illustrate the nature of the fringing forest with reference to the seasonal needs of the tsetse-fly.

D. S. Bertram

Tendeiro, J. Estudos sobre tripanosomíases animais. III—Infestação experimental de alguns animais pelo *Trypanosoma brucei* Plimmer e Bradford 1899. [**Studies on Animal Trypanosomiases. III. Experimental Infection of Animals with** *Trypanosoma brucei*] Reprinted from *Bol. Cultural Guiné Portuguesa*. 1952, Apr., No. 26, 321–5, 6 figs. on 3 pls. [15 refs.]

The author records various observations on strains of *Trypanosoma brucei* in Portuguese Guinea. The following animals were found to be susceptible to infection with this trypanosome: white rats, monkeys (*Cercopithecus aethiops sabaeus*), pigs, calves, goats and dogs. In natural infections of pigs, the identity of *T. brucei* was determined by inoculation of rats, in which the infection ran an acute course terminating rapidly in their death, in contrast to *T. gambiense* which does not readily infect these animals. The effect of baboon (*Papio papio*) serum on *T. brucei* was tested by exposing the trypanosomes *in vitro* to various dilutions of the serum, and then inoculating them into rats: of 4 rats thus treated 2 became infected, while 2 were refractory. The possible rôle of fowls as reservoirs of *T. brucei* was tested by inoculating a rat with the blood of a fowl which had previously been exposed to the bites of infected *Glossina palpalis*. Though no trypanosomes could be detected in the blood of the fowl, a heavy infection was produced in the rat 4 days after the inoculation. The paper is illustrated by a number of photomicrographs depicting the trypanosomes.

C. A. Hoare

See also p. 1158, Young, **Microfilariae and Trypanosomes found in a Blood Survey of Liberia.**

Dias, E. Doença de Chagas nas Américas. IV—Bolívia e Paraguai. [**Chagas's Disease in the Americas. IV. Bolivia and Paraguay**] *Rev. Brasileira Malariologia*. Rio de Janeiro. 1953, Jan., v. 5, No. 1, 11–16. [33 refs.]

The English summary appended to the paper is as follows:—

"The geographic distribution of triatomid bugs in Bolivia and Paraguay is recorded. The existing species, marked * the ones naturally infected with flagellates, are:

"Bolivia: *Psammolestes coreodes*, **Panstrongylus geniculatus*, *Triatoma guasayana*, **Triatoma infestans*, *Eratyrus mucronatus*, **Triatoma oswaldoi*, *Rhodnius pictipes*, **Triatoma sordida* and *Triatoma venosa*;

"Paraguay: *Psammolestes coreodes*, *Panstrongylus geniculatus*, **Triatoma infestans*, *Panstrongylus megistus*, *Triatoma oswaldoi*, *Panstrongylus guentheri* and *Triatoma sordida*.

"The main local vector of *Schizotrypanum cruzi* is *Triatoma infestans*. Out of 17,102 insects examined for flagellates, 11,290 or 66 per cent were positive.

"*Canis familiaris*, *Felis domesticus* and *Cavia cobaya* have been found naturally infected with *S. cruzi* in Bolivia.

"Nearly 232 cases of Chagas' disease have been detected in both countries and their geographic distribution is given."

Dias, E. Doença de Chagas nas Américas. V—Equador e Peru. [**Chagas's Disease in the Americas. V. Ecuador and Peru**] *Rev. Brasileira Malariologia*. Rio de Janeiro. 1952, Oct., v. 4, No. 4, 319–31, 3 maps. [33 refs.]

The English summary appended to the paper is as follows:—

"1—The geographic distribution of the species of triatomid bugs that exist in Ecuador and Peru is recorded.

"2—The species so far reported from these countries are:

Ecuador	Peru
Triatoma carrioni	*Panstrongylus chinai*
Triatoma dimidiata	*Triatoma dimidiata*
Triatoma dimidiata capitata	*Panstrongylus geniculatus*
Triatoma dispar	*Panstrongylus herreri*
Rhodnius pictipes	*Triatoma infestans*
Rhodnius prolixus	*Triatoma oswaldoi*
Panstrongylus rufotuberculatus	*Rhodnius pictipes*
Triatoma venosa	*Rhodnius robustus*
	Panstrongylus rufotuberculatus

"3—The only species naturally infected with *Schizotrypanum cruzi* in Ecuador is *T. dimidiata* and in Peru *T. infestans*.

"4—Animal reservoirs of *S. cruzi* so far reported are *Canis familiaris*, *Didelphis azarae* or *D. paraguayensis* and *Dasyprocta aguti* from Ecuador, and *Canis familiaris* and *Cavia cobaya* from Peru.

"5—Nearly 200 cases of Chagas' disease have been recognized in Ecuador and only 2 cases in Peru.

"6—It is likely that the first case reported from Peru (Escomel, 1919) had not been due to *Schizotrypanum cruzi* Chagas, 1909, but to a true trypanosome, as suggested by Yorke who, based on Escomel's description of the flagellate, named it *Trypanosoma escomeli* Yorke, 1920. The possibility of *Trypanosoma rangeli* Tejera, 1920 and *Trypanosoma escomeli* Yorke, 1920 being synonyms, is suggested."

De Lucena, D. T. & Costa, L. Estudos preliminares sôbre a doença de Chagas na Paraíba. [**Preliminary Studies of Chagas's Disease in Paraiba, Brazil**] *Rev. Brasileira Malariologia*. Rio de Janeiro. 1953, Jan., v. 5, No. 1, 55–68, 2 figs. & 2 maps.

The English summary appended to the paper is as follows:—

"1. A survey was started in the State of Paraiba to make understood different data concerning Chagas' disease. In this first report results are presented which can be summarised as follows.

"2. From 258 localities surveyed, 113 were infested by *Triatominae* (43·80%) and in 15 places were encountered cone nosed bugs infected by *Trypanosoma cruzi* Chagas, 1909. Houses visited (4039) were positive in the percentage of 6·71% (271).

"3. There were collected 2655 *Triatominae* of the following species: *Panstrongylus megistus*—91·90%, *Triatoma maculata*—8·06%, *T. brasiliensis*—0·04%. One specimen of *P. lutzi* was captured in one house not surveyed.

"4. In the 15 localities with *Triatominae* infected, *P. megistus* was frequent in 10 and *T. maculata* in 5. Despite in some places the percentage

of infectivity had been particularly high, total indices were the following:— *P. megistus*—1·50%, *T. maculata*—3·27% (specific indices).

"5. Specificity of the strain of *T. cruzi* was proved by inoculation in guinea pigs of feces of *Triatominae* with metacyclical forms in the rectal contents; one of which revealed Trypanosomes in circulating blood one month after. These forms are seen in microphotos 1 and 2.

"6. The survey is going on and a complete report will be given later."

De Bustamante, F. M. & Gusmão, J. B. Sôbre um foco de *Triatoma infestans* nos Municípios de Resende e Itaverá, Estado do Rio de Janeiro. [**Focus of** *Triatoma infestans* **in the Resende and Itaverá Region, Rio de Janeiro**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1953, Jan., v. 5, No. 1, 23–8.

The English summary appended to the paper is as follows:—

"The authors present detailed information about a focus of *Triatoma infestans* including the counties of Resende and Itaverá, state of Rio de Janeiro, and bordering the state of São Paulo.

"They discuss several epidemiological aspects which suggests that the focus is of recent formation. The relatively low index of infection of the vector (3·4 per cent), the low percentage of positivity for the Machado and Guerreiro reaction among individuals living at the focus (about 6 per cent), and the absence of signs of Chagas' disease cardiopathy in the electrocardiograms of individuals presenting a positive Machado and Guerreiro test seem to indicate that the disease does not yet constitute a serious problem in that region, although the studies concerning this problem are not concluded.

"Yet, the complete eradication of *T. infestans* from its foci in the counties of Resende and Itaverá is considered possible, through the use of insecticides and measures to prevent its spread to other areas of the state of Rio de Janeiro, which is a prophylactic program already begun."

Romaña, C., Briones, S. & Scheffels, E. L. Encuesta epidemiológica sobre enfermedad de Chagas en el oeste de la provincia de Buenos Aires. [**Epidemiological Survey of Chagas's Disease in the Western Part of the Province of Buenos Aires**] *An. Inst. Med. Regional.* Tucuman, Argentina. 1953, June, v. 3, No. 3, 245–50, 1 map.

The English summary appended to the paper is as follows:—

"The authors report on an investigation carried out in the western part of the Province of Buenos Aires, on domestic triatomine bugs and the diagnostic of human infection by *S. cruzi* by means of xenodiagnostic. In 10 localities visited domestic *Triatoma infestans* were found to be infected with *S. cruzi*, and in seven of these 10 localities, positive xenodiagnostics for humans were obtained. A total of 196 xenodiagnostics were carried out, 17 of which were positive. This investigation proves that Chagas' disease is endemic in the west of the Province of Buenos Aires."

Manso Soto, A. E. & Rispoli, J. A. Enfermedad de Chagas en Mendoza. Su importancia como problema sanitario. [**Importance of Chagas's Disease as a Sanitary Problem in the Mendoza Region, Argentina**] *Universidad Buenos Aires: Mision de Estudios de Patologia Regional Argentina. Publicaciones Nos. 81/82.* 1952, v. 23, 13–19, 8 figs.

Romaña, C. & Toranzos, L. B. Acerca del cultivo de "Schizotrypanum cruzi" en huevos. [**Cultivation of *T. cruzi* in Eggs**] *An. Inst. Med. Regional.* Tucuman, Argentina. 1953, June, v. 3, No. 3, 265–6.

The English summary appended to the paper is as follows:—

"The authors report experiments on culture of *S. cruzi* in eggs using Rabinowitz' technique for rickettsias. Just as Manso Soto and collaborators they obtained the development of abundant extracellular colonies. No intracellular multiplication forms of the parasite were obtained."

Seaman, G. R. **The Succinic Dehydrogenase of *Trypanosoma cruzi*.** *Exper. Parasit.* New York. 1953, July, v. 2, No. 3, 236–41, 2 figs. [20 refs.]

"Cell free extracts of *Trypanosoma cruzi* were prepared which show succinic dehydrogenase activity as measured by oxygen uptake in the presence of methylene blue and by the reduction of cytochrome *c*."

Pizzi P., T. Localización pancreática predominante y fenómenos de esteatonecrosis en ratones experimentalmente infectados con *Trypanosoma cruzi*. [**Pancreatic Localization of *T. cruzi* in Rats Infected Intraperitoneally, with Resulting Fat Necrosis**] *Bol. Informaciones Parasitarias Chilenas.* 1953, Jan.–Mar., v. 8, No. 1, 11–13, 2 figs. [10 refs.]

The English summary appended to the paper is as follows:—

"C3H mice inoculated intraperitoneally with citrated blood containing virulent forms of *Trypanosoma cruzi*, showed in some instances, a predominant localization of the parasites in the pancreatic cells. The animals showed areas of fat necrosis probably due to the destruction of pancreatic cells as result of the multiplication of the parasite."

Loretti, G. A. Sobre dos casos de chagomas metastásicos. Su patologia. [**Pathology and Some Cases of Metastatic Growths in Chagas's Disease**] *Universidad Buenos Aires: Mision de Estudios de Patologia Regional Argentina. Publicaciones Nos. 81/82.* 1952, v. 23, 21–31, 10 figs. [15 refs.]

Romaña, C., Vasvari, J. & Rothe, A. Probable caso congénito de enfermedad de Chagas. [**Apparent Case of Congenital Chagas's Disease**] *An. Inst. Med. Regional.* Tucuman, Argentina. 1953, June, v. 3, No. 3, 241–4, 1 fig. on pl.

The English summary appended to the paper is as follows:—

"The authors refer to an apparently congenital case of Chagas' disease.

"During a survey for hemoparasites carried out in the city of Salta, a fifteen days old girl was found to show *S. cruzi* in her blood, without any visible symptoms of Chagas' disease. For her mother xenodiagnostic and complement fixation test were positive.

"The authors eliminate as very little probable direct contamination through contact with triatomine bugs or through contamination by the mother's milk. They arrive at the conclusion that intrauterine infection is the most probable source of contamination."

Romaña, C. Algunos síntomas agudos poco observados en la enfermedad de Chagas. [**Some Overlooked Symptoms in Acute Chagas's Disease**] *An. Inst. Med. Regional.* Tucuman, Argentina. 1953, June, v. 3, No. 3, 251–4, 4 figs. on pl. English summary (5 lines).

The symptoms here described are, perhaps, not so much overlooked as misunderstood or misinterpreted, their trypanosomal origin not being recognized, nor even suspected. Three such conditions are referred to: 1. Orchiepididymitis in young children. A case in an infant of 2 months is detailed and illustrated, with acute swelling the exudate from which injected into white mice proved the presence of *T. cruzi*; it was present also in large numbers in the blood. 2. Inflammation of the parotid gland and swelling of the parotid region. This also is illustrated by a photograph which shows also Romaña's oedema of the eyelids. 3. Strabismus, often accompanying the "eye-sign" with inflammation of the orbital tissues. *S. cruzi* may be seen in the affected ocular muscles. *H. Harold Scott*

Romaña, C. Ensayos de antibióticos y quimioterápicos en enfermedad de Chagas. [**Trial of Antibiotics and Chemotherapy in Chagas's Disease**] *An. Inst. Med. Regional.* Tucuman, Argentina. 1953, June, v. 3, No. 3, 255–63, 5 charts. [14 refs.] English summary.

It is a pity when a carefully planned piece of research, carried out on sound lines and with much attention to detail, yields results practically negative. At the same time the author should earn the gratitude of those who will be spared the tedium and disappointment of carrying out similar work fruitlessly.

Professor Romaña shows how serious is infection by *T. cruzi* in South America, both in the acute stage when it causes death of many infants and in the later stages as the cause of chronic cardiac affections. Next, he records trial of various antibiotics, penicillin, aureomycin, streptomycin, chloramphenicol and oxytetracycline, on cultures of *T. cruzi*, on infections in laboratory animals and in a few human cases, but all ineffectual. [It is well known that conditions react differently to antibiotics and Chagas's disease might react to other antibiotics than those mentioned.]

He then refers to chemotherapeutic methods, the use of 7602(ac) Bayer, Cruzon (or ICI-3024) and the Win preparations and 70-A which Eagle had found useful in African trypanosomiasis. Bayer 7602 proved highly toxic when given intravenously, and intramuscularly caused much pain and local lesions; 70-A had no action of *T. cruzi*. He then tried an oxyarsenobenzol preparation, Spirotrypan (Hoechst). "One drop" of this rapidly killed *T. cruzi* in culture; 1 in 10 also killed, but more slowly; 1 in 100 was not lethal. In infected guineapigs it brought about rapid disappearance of the trypanosomes but they were present again in a few days. Tried in 150 cases in man in the acute stage it caused much pain and local lesions when injected intramuscularly, was well borne intravenously in moderate doses, but if increased it caused albuminuria and other toxic symptoms. Xenodiagnostic tests proved negative when repeated "up to some months" afterwards, but complement fixation remained positive, indicating that the infection had not altogether disappeared. Pentaquine, Isopentaquine and Primaquine, 3 Winthrop preparations, were next tried in 70 patients in doses of 5 mgm. for infants and up to 20 mgm. for adults, later 3–4 times these doses, and Primaquine even up to 90 mgm. per kilo, but xenodiagnostic

tests continued positive, although there was improvement clinically and trypanosomes in the peripheral blood seemed to be fewer.

H. Harold Scott

LEISHMANIASIS

Biagi F., F. & de Biagi, Ana M. de B. Algunos flebotomus del área endémica de leishmaniasis tegumentaria americana del Estado de Campeche, (Méx.). [**Some Species of *Phlebotomus* from an Endemic Area of Cutaneous Leishmaniasis in the State of Campeche, Mexico**] *Medicina.* Mexico. 1953, July 10, v. 33, No. 679, 315–19. [27 refs.]

Small collections of *Phlebotomus* from an area in Mexico endemic for cutaneous leishmaniasis include *P. cruciatus*, *P. shannoni*, *P. panamensis* and *P. intermedius*, the last two species being the first records for Mexico. It would seem that some of each species were taken biting man as they are referred to as anthropophilic species. But there is very little information about their habits nor does their possible part in the transmission of the disease exceed a brief record of inconclusive work with some of the species elsewhere.

Other species taken in Mexico by earlier workers are *P. almazani* and *P. yucatanensis*.

D. S. Bertram

FEVERS OF THE TYPHUS GROUP

Harries, C. V. **Typhus Fever. A Historical Review, with reference to the Epidemics in Algeria and Naples during the Second World War.** *J. Roy. Nav. Med. Serv.* 1953, v. 39, No. 3, 142–56. [29 refs.]

Gambardella, A. & Tecce, N. Ricerche sierologiche (Weil-Felix) su eventuali infezioni da Rickettsie nella popolazione di Napoli. [**Serological Study (Weil-Felix) of the Potential Infection of the Population of Naples with Rickettsial Disease**] *Acta Med. Italica.* 1953, June, v. 8, No. 6, 152–4. [21 refs.]

The English summary appended to the paper is as follows:—

"To the end of revealing eventual cases of Rickettsial diseases in the population of Naples, Weil-Felix's reaction has been made on the sera of 590 subjects, 405 of whom were suffering with acute diseases with fever of unknown nature.

"In all cases, absence of antiproteus agglutinins was established."

De Rodaniche, Enid C. **Natural Infection of the Tick, *Amblyomma cajennense*, with *Rickettsia rickettsii* in Panama.** *Amer. J. Trop. Med. & Hyg.* 1953, July, v. 2, No. 4, 696–9.

A strain of *Rickettsia rickettsii* was recovered in March, 1952, by guinea-pig inoculation of a pooled suspension of a lot of 11 adult ticks, *Amblyomma cajennense*, collected from a horse in a locality in Panama where 3 cases of Rocky Mountain spotted fever had been confirmed in 1950 and 1951. The

strain was highly virulent, causing scrotal reaction and a mortality rate of 90 per cent. in guineapigs; it showed complete cross-immunity with a known strain of *R. rickettsii*. Three other lots of ticks of the same species and a large lot of 1,000 unidentified larval ticks caused no illness in guineapigs, which, however, developed complement-fixation reactions against *R. rickettsii* antigens at titres of 1–8 to 1–32. An unstated number of other lots of ticks, including a "limited number" of *Otocentor nitens*, were found free from evidence of infection. The total number of adult ticks collected by dragging and from animals was 2,436 *A. cajennense*; 194 *O. nitens* and 24 *A. oblongoguttatum*. About 8,000 nymphal *Amblyomma* ticks and innumerable unidentified larval ticks were collected.

John W. D. Megaw

Cvjetanović, B., Fališevac, J., Mihaljević, F., Kozmar, D., Topolnik, E., Vesenjak-Zmijanac, J. Epidemija Q groznice u Ogulinu i njezin profesionalni karakter. [**Q Fever Epidemic at Ogulin in 1952 and its Occupational Features**] *Arhiv Hig. Rada.* Zagreb. 1953, v. 4, No. 1, 14–32, 1 folding graph & 3 figs. [91 refs.] English summary.

An outbreak of Q fever occurred in the town of Ogulin in Jugoslavia in April, 1952, at the height of an epidemic of an influenza-like illness. The diagnosis was established by serological means in 26 cases; butchers and other men working in contact with domestic animals were mainly affected, and a laboratory worker contracted the disease while handling infected material. The onset was acute, with headache, fever, rigors, cough and muscle and joint pains. Pneumonia developed in one-third of the patients, and was presumably indicative of a dust-borne infection. Fever lasted for 4–14 days and passed off by lysis; there were no complications and no case was fatal. Complement-fixation tests were carried out on the sera of 97 persons and 87 animals; the titres in the 26 positive cases ranged up to 1280 or higher, and a rise in titre during the course of illness was seen in 23 instances. Titres ranging from 10–80, indicative of past infection, were found in 9 healthy subjects. Antibody was present in the sera of 4 of 77 sheep, which were presumably the reservoir of infection. One of the earliest recognized cases concerned a butcher working in the town slaughterhouse; a residual titre of Q fever antibody was found in the sera of 3 fellow workers, who may have been infected previously. The infection had probably been introduced with sheep from another locality and spread by sheep ticks; the slaughterhouse, market and community centre were suspected of being foci of dissemination.

D. J. Bauer

RABIES

Nikolitsch, M. Zweiter Beitrag zur Frage des Infektionsmechanismus bei den neurotropen Virusarten. [**Second Observation on the Method of Infection by Neurotropic Viruses**] *Arch. f. Hyg. u. Bakt.* 1953, v. 137, No. 1, 11–19. [11 refs.]

This paper follows an earlier account [this *Bulletin*, 1953, v. 50, 212] of experiments in which rabbits were found more susceptible to intracerebral injection of street virus following insulin shock.

The author has collected from his own case records and from other publications case-histories in which the onset of rabies has followed very closely on the receipt of some physical or psychic trauma.

In all, 6 cases of physical trauma (falls, knocks on the head, sudden immersion in cold water), 12 of psychic trauma (2 cases of his own, 10 from the literature) and 3 cases in which rabies followed very shortly after childbirth, are reported.

Diagnosis was in most cases confirmed by finding Negri bodies or by animal inoculation or both. Several of the patients had previously received courses of anti-rabies inoculations.

In a fairly lengthy discussion, the author develops his view that some "molecular change" in the nerve cell, produced by the physiological or psychological effects of trauma, or by insulin shock, potentiates invasion of the cell by the virus. [The small number of cases reported in this paper cannot be said to prove the author's hypothesis: they do no more than raise the possibility that traumata may have some potentiating effect.]

The latter part of the discussion extends the application of the "molecular change in neurones" idea to explain the protective effect of fixed virus vaccines. [This part of the argument is not convincing; it rests in part on inability to demonstrate antibodies, but completely ignores the large volume of work that has been done on anti-rabies antibodies. It supplies no valid reason for changing current views on immunity to rabies.]

E. T. C. Spooner

Béquignon, R., Guichard, A. & Vialat, C. Apparition de corps de Negri dans les lésions provoquées par le virus fixe (souche Louis Pasteur) sous l'action de la hyaluronidase. [**Development of Negri Bodies in Lesions Provoked by the Pasteur Strain of Fixed Rabies Virus after Treatment with Hyaluronidase**] *Ann. Inst. Pasteur.* 1953, Aug., v. 85, No. 2, 263–4, 1 fig.

While loss of capacity to give rise to Negri bodies is a characteristic of fixed rabies virus, some strains under certain conditions may retain this faculty.

The authors have already shown [this *Bulletin*, 1949, v. 46, 728] that the addition of saliva or of hyaluronidase to an emulsion of the Pasteur strain of fixed virus restored its virulence for rabbits by the subcutaneous route: furthermore, in addition to histological lesions typical of fixed virus rabies, there appeared, at the level of the neurones in the outer layer of Ammon's horn, oxyphilic inclusion bodies in the nuclei, but not in the cytoplasm.

They now report that after successive intracerebral passages of the modified strain in rabbits (which was lethal in 16 days), they have found oxyphilic inclusion bodies in the cytoplasm in the same anatomical situation: structurally and in their staining reactions, these inclusions show the classical characteristics associated with Negri bodies.

The authors consider that these clinical and histological modifications serve to confirm the possibility of a "*retour en arrière*" of the Pasteur strain of fixed virus in certain conditions, although the characters of strain, isolated in 1882, have been regularly studied in rabbits in Paris for 50 years.

H. J. O'D. Burke-Gaffney

Banič, S. Bedeutung des sekundären Stimulus bei der Tollwut-Schutzimpfung. [**Importance of Secondary Stimulus in Antirabies Vaccination**] *Ztschr. f. Immunitätsf. u. Exper. Therap.* 1953, May 7, v. 110, No. 3, 240–42.

Hempt has advised that his carbolized ether rabies vaccine will give a higher and more lasting immunity if 6 daily injections, as primary stimulus,

are followed 3 weeks or a month later by a single injection to elicit a "secondary response".

Banić, arguing that this interval is too long for practical purposes because vaccinated subjects who subsequently develop rabies commonly do so after a short incubation period, has tried the effect of shorter intervals on white rats and white mice. The challenge was an intramuscular dose of fixed virus. With rats, one series received 5 daily injections of 1 ml. of a Hempt-type vaccine, the other receiving 4 daily injections and the fifth 15 days later. With mice, 6 injections of 0·2 ml. were used, on consecutive days in one series, and, in the other series, 5 daily injections followed 14 days later by the sixth. All animals, with 5 control rats and 8 control mice, were challenged 25 days after the beginning of vaccination. A small difference in survival rate between the "consecutive" and "separated" series was recorded both for rats and mice, which the author claims as showing that a secondary response elicited at 14–15 days is worth while.

[The numbers of animals used were small; the differences noted were also small and of rather doubtful significance. It seems a little dangerous to argue from rats and mice infected with fixed virus to the human disease. But, if the author has scarcely proved his point, he has certainly not disproved it.] *E. T. C. Spooner*

PLAGUE

Norris, E. W., Schneider, L. B., Hanchett, L. J., Kohler, C. E. & Buren, W. F. **Investigation of Jute Imports as Potential Plague Source.** *Pub. Health Rep.* Wash. 1953, Aug., v. 68, No. 8, 802–4.

The authors give references to reports of several outbreaks of plague on the west coast of South America which are said to have been traced to infected fleas found in shipments of jute bags from India and to an unpublished report of the survival of infected *Xenopsylla cheopis* fleas after being enclosed for 30 days or more in bags in optimum conditions of temperature and humidity. The experiments now described were as follows.

From 179 bales of hessian cloth, freshly imported from India to San Francisco, 152,000 yards of the cloth and wrappers were thoroughly examined by brushing them over white sheets and searching the débris; no fleas, alive or dead, nor parts of fleas were found.

At San Juan, Porto Rico, a similar examination was made of 4,994 gunny bags and the wrappers of 67 bales of the bags; 118 insects, of which 89 were alive, were found but all belonged to species indigenous to Porto Rico and no fleas were found.

At San Francisco two lots of 30 healthy fleas were placed in cotton bags and inserted at different levels in a bale of jute which was packed and compressed in the usual way and then sent on a voyage to Japan and back lasting 49 days. No fleas survived the voyage. So also there were no surviving fleas from two lots of fleas sent on voyages of 23 and 22 days, respectively, to Hawaii and back; one lot of 150 healthy fleas was enclosed in a cotton bag containing a few wood shavings and packed in a cardboard container which was enclosed in a wooden box; the other lot of 100 healthy fleas was enclosed in a wooden box in which 2 cut apples were placed to provide moisture.

The authors conclude that past experience of the importation to the U.S.A. of about 350,000 tons of jute materials, yearly, from India and

the findings in the present experiments validate the statement made by the Public Health Service of the U.S.A. in 1937 that " while it may not be without the realm of possibility that, under favorable meteorological conditions, fleas without a host can serve as reservoirs of plague infection, [and] . . . transmit the disease, such danger is probably insignificant in comparison with the danger from infected fleas carried by rats ".

John W. D. Megaw

KHATRI, L. D. **Plague and Anti-Plague Measures in Hyderabad State, with special reference to the Use of DDT.** *J. Roy. San. Inst.* 1953, Sept., v. 73, No. 5, 494–8, 1 fig. Discussion 498–9.

A remarkable reduction in the incidence of plague in Hyderabad State followed a systematic campaign of flea destruction by DDT.

The State has an area of nearly 85,000 square miles and a population of about 17,000,000. Plague has persisted in the greater part of the State since 1897, mostly in the form of seasonal epidemics which occurred every year in some areas and at irregular intervals of several years in other adjoining areas. Since 1925 the epidemics have been less severe, but even since 1944 the number of cases reported yearly has averaged about 7,000, and in 1949 it was 6,858 with 2,069 deaths. In 1950 the number fell to 3,161 with 764 deaths; in 1951 there were 464 cases and in 1952, " up to December ", there were only 17 cases and 2 deaths. The systematic use of DDT was started towards the end of 1949, first with a spray of 2½ per cent. DDT in kerosene and later with a dusting powder containing 10 per cent. DDT of which 38 tons were used in 1951–52. The powder was introduced into the rat burrows with a Cyanogas foot-pump and some was applied round the mouth of each burrow. When an epidemic was present or threatened the belongings of the inmates of houses were dusted with the powder or sprayed with a suspension, prepared by adding one pound of 50 per cent. DDT wettable powder to 2 gallons of water. This spray was also applied to the lower part of the walls and to the roofs even when there was no threat of an epidemic.

The staff employed was 6 medical officers, 88 health inspectors and 892 other workers.

In the discussion of the paper Mr. C. B. SYMES, Officer in Charge, Colonial Insecticides, referred to the lethal effect of DDT on rats and asked whether this had been observed in Hyderabad; he also asked whether any loss of susceptibility of the fleas to DDT had been observed such as had been reported in Greece; the answer to both questions was in the negative.

John W. D. Megaw

MILES, V. I. & WILCOMB, M. J., Jr. **Control of Native Rodent Fleas with DDT applied to simulate Aerial Dusting.** *J. Econom. Entom.* 1953, Apr., v. 46, No. 2, 255–7.

With the discovery of several foci of sylvatic plague in Western Texas in 1947–1949, the need was apparent for a practical method of controlling fleas over wide areas of native rodent habitat, in the event of plague spreading to centres of human populations. In order to determine the feasibility of dusting from aircraft, preliminary trials of hand dusting from the ground were undertaken.

An area densely populated with flea-infested pack rats (*Neotoma micropus*) was selected and 3 plots, ranging from 3 to 15 acres in extent, with well-defined limits, were chosen. In addition, 2 control plots were marked out. The insecticidal dust (10 or 25 per cent. DDT) was distributed

from rotary blowers by men walking across the plots. To simulate aircraft application the application was as even as possible, no special attention being given to obvious sites of rat burrows. The doses used were respectively 1, 3 and 5 lb. DDT per acre.

Results were assessed by trapping about a dozen rats per plot, one week before and 1, 2 and 4 weeks after treatment. Rats were put in bags with cyanide and fleas collected and identified. The greatest number were sticktight fleas *Echidnophaga gallinacea*, which, being unlikely to come much in contact with the DDT, were considered separately. Of the remainder, about 95 per cent. were *Orchopeas sexdentatus*.

The results indicated a slight fall in non-sticktight fleas after 1 week with 1 lb. DDT per acre and a distinct fall in these fleas at this time with the higher doses. There was no significant reduction apparent after 2 or 4 weeks with any treatment. The numbers of sticktight flea were not significantly affected at any time. During the first week after dusting there was evident reduction in various insect species, such as ants and grasshoppers, but their numbers recovered within the next 2 weeks. There was no effect from the DDT on the rat population, though the excessive trapping (for sampling) may have somewhat reduced numbers and this increased the density of fleas on survivors. *J. R. Busvine*

Hirst, L. F. **The Conquest of Plague. A Study of the Evolution of Epidemiology.**

This book is reviewed on p. 1179.

CHOLERA

Ranta, L. E. & McCreery, Paula M. **The Antigenicity of Cholera Vaccine prepared in Fluid Medium.** *Canadian J. Med. Sci.* 1953, Aug., v. 31, No. 4, 338–42.

"Cholera vaccine prepared in a chemically defined fluid medium (containing tyrosine, asparagine, glycine, and inorganic salts) was compared antigenically in mice with vaccines prepared by standard methods. The mean LD50 for normal mice with 108 ± 9·1 *V. comma* [*V. cholerae*] of the strain employed for challenging. Both vaccines afforded a high degree of protection. Mice immunized with bivalent (Ogawa and Inaba) Standard vaccine had a mean LD50 of 40·0 ± 4·7 million *V. comma*. Mice protected by bivalent fluid-prepared vaccine had a mean LD50 of 32·7 ± 6·0 million *V. comma*. The difference is not statistically significant. Vaccines prepared in fluid medium were relatively unstable."

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

Inoki, S., Takada, S. & Nakabayasi, T. **New Culture Mediums for *Endamoeba histolytica*.** *Amer. J. Clin. Path.* 1953, Feb., v. 23, No. 2, 197–9.

This is another version of a previous paper by Inoki, Nagai, Kitamura, Takada and Nakabayasi already reviewed [this *Bulletin*, 1951, v. 48, 633]. The use of the media is described with considerable technical detail.

C. A. Hoare

Bradin, J. L., Jr. **Studies on the Production of Hyaluronidase by *Endamoeba histolytica*.** *Exper. Parasit.* New York. 1953, July, v. 2, No. 3, 230–35, 1 fig. [17 refs.]

"The five strains of *Endamoeba histolytica* studied did not produce detectable amounts of hyaluronidase when maintained exclusively in cultures over long periods of time. Those strains which were infective for the hamster did produce hyaluronidase, as evidenced by studies with organisms recovered from experimentally induced hamster liver abscesses. The rate of action of this enzyme was correlated with the numbers of amebas present."

Stewart, I. **Amoebic Granuloma of the Colon.** *Proc. Roy. Soc. Med.* 1953, Aug., v. 46, No. 8, 613–15 (Sect. Proctology 11–13).

The author was in charge of a dysentery ward in a military hospital in India for 2 years, during which he saw 363 British troops with amoebic dysentery; 13 of the 363 (3·6 per cent.) had palpable masses in the colon considered to be amoebomata. The first patient died after a laparotomy; further examples from the literature of the disastrous results of surgical interference are cited. Of the 12 other patients 11 had caecal amoebomata and one of these died from this and a gross amoebic liver abscess, while the last had a rectal amoeboma. All were treated with emetine [but it seems that no adequate steps were taken to sterilize the infection and thus it is not surprising that dysenteric relapses occurred in some cases].

A. R. D. Adams

Jarpa G., A. & Allende U., J. Un caso de balantidiasis humana. [**A Human Case of Balantidiasis in Chile**] *Bol. Informaciones Parasitarias Chilenas.* 1953, Jan.–Mar., v. 8, No. 1, 14.

RELAPSING FEVER AND OTHER SPIROCHAETOSES

Bell, S. **Predisposing Factors in Tick-Borne Relapsing Fever in Meru District, Kenya.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1953, July, v. 47, No. 4, 309–17, 1 fig. [18 refs.]

This paper is based on cases of relapsing fever recorded at the Beresford Memorial Hospital, Maua, Meru, Kenya, from 1941 to 1950.

Meru reserve is on the north-eastern slope and foothills of Mount Kenya and the altitude varies between 2,000 and 9,000 feet. Most of the villages lie off the roads and are connected by bush paths. The Ameru people numbered 312,917 in the 1948 census. Huts are of pole, mud and thatch, about 12 feet in diameter, are dark within with a central fire-place on the floor, and ticks are usually found in the superficial 2 or 3 inches of soft soil near the walls. Clothing is of cowhide skirts or a piece of calico or blanket, washing is infrequent and body-lice are common.

Relapsing fever has been endemic in the Meru District for many years but there was an unusual increase in cases reported in 1945 and 1946. No evidence has been found that the increase in Meru was due to any vector other than *Ornithodorus moubata*.

Patients on admission were supplied with clean clothing, and details of residence and a rough estimate of age taken by a dresser. In all suspected

cases thin blood films were taken and stained with Leishman, only those patients with positive films being included in the returns. [Thick films might have proved more satisfactory and quicker to examine.] Among 11,918 patients seen during 7 years 370 cases of relapsing fever were recorded, and the figures showed a seasonal increase in admissions during the first 3 months of the year and a decrease during the colder months. The overall death rate was 8·1 per cent. and the sex ratio was 139 cases in females for every 100 in males, the disease tending to be milder in adults.

Accurate estimation of age is, of course, very difficult in a primitive community but the disease was most common in infants under the age of one year and the incidence became progressively less in the older age-groups. Excluding the first year of life the incidence was highest among females aged from 5 to 9 years. It is considered that the incidence in infants might be reduced by providing simple raised cots in huts. It is suggested that anti-tick measures (with Gammexane) could be used most profitably in the period immediately before the hot season.

Five cases of relapsing fever, with 3 deaths, in new-born infants are recorded in detail, and 3 of these (2 fatal) were in triplets. Treatment of these 5 patients was by oral stovarsol (fatal) in one case, intramuscular penicillin and oral stovarsol (recovery) in another, and intramuscular penicillin and an arsenical (one recovery, but death occurred later from enteritis and bronchopneumonia) in the case of the triplets.

There are several records in the literature of new-born infants developing relapsing fever within 10 days of birth [this *Bulletin*, 1936, v. 33, 695; 1946, v. 43, 224; 1947, v. 44, 426]. Bite by an infected tick is quite possible in cases where the mothers were delivered in their own homes but unlikely in hospital cases. Transplacental transmission is difficult to explain in view of the usual interval of about a week or more between birth and evidence of the disease. The possibility of inoculation of infected blood from the mother into abrasions, mucous membranes or the cut end of the cord must be remembered. Details are shown in 4 tables and a figure.

C. F. Shelton

Cambournac, F. J. C., Roque, R. de A. & Rés, J. F. Experiências com alguns antibioticos em infecções causadas por *Borrelia hispanica*. [**Experiments with Antibiotics in Infection by** *Spirochaeta hispanica*] Reprinted from *Clin. Contemporanea*. 1951, Dec., v. 5, No. 10, 524–31, 7 charts.

The use of antibiotics in the treatment of relapsing fever has often been referred to in this *Bulletin* [*e.g.*, penicillin, 1952, v. 49, 151, 513, 959; aureomycin, *ibid.*, 275; chloramphenicol, *ibid.*, 513; terramycin, *ibid.*, 698, and 1953, v. 50, 815, 941; streptomycin, *ibid.*, 418, 959].

The authors start by quoting patients to whom they gave penicillin, with results not very satisfactory; then one with penicillin followed later by neo-arsenil. To others they gave neo-arsenil only, again with unsatisfactory results. Trials with penicillin and neo-arsenil proved no better beyond prolonging the apyrexial period. Consequently they undertook experimental work with guineapigs infected with *Sp. hispanica*, testing chloramphenicol, terramycin [oxytetracycline], aureomycin, streptomycin and penicillin in varied doses. Groups of 10–12 animals were inoculated with the spirochaetes intraperitoneally; 2 controls were left with each group. A series of

tables shows the doses given and the results of examination of the blood for spirochaetes each day.

The first series of experiments showed that chloramphenicol seemed to have no noticeable effect on the disease in guineapigs, while terramycin caused the spirochaetes to disappear after the first dose, but death of the animals precluded estimation of its value therapeutically. They, therefore, repeated the experiment but reduced the dose from 100 mgm. per kilo to 30 mgm. per kilo and found that aureomycin caused disappearance of the spirochaetes after the first dose, whereas terramycin was slower in action and did not prevent reappearance of the spirochaetes. Streptomycin in doses of 40 mgm. per kilo proved efficacious in suppressing the parasitaemia after 2 days' treatment. Penicillin G was again tried in doses of 8,000–16,000 units per kilo, but merely reduced the number of spirochaetes and did not cure. Administration of antibiotics to 2 human patients was finally tried. The first, a boy of 6 years, was given 0·5 gm. of terramycin every 6 hours for 9 doses, or a total of 4·5 gm. and there was no further access of fever; the second, a man of 38 years, received 0·5 gm. of aureomycin every 6 hours for 24 hours, then every 8 hours to a total of 4 gm. The result was uncertain because on the following day he had a rise of temperature, but without parasites being found in his blood.

The authors conclude, from their limited experiments, that streptomycin, aureomycin and terramycin are efficacious in infected guineapigs, but that more extensive trials are needed before any valid claims can be made for human infections. [No reference is made to the fact that certain arsenicals may inhibit the effect of some antibiotics (see this *Bulletin*, 1953, v. 50, 418).] *H. Harold Scott*

YAWS AND OTHER TREPONEMATOSES

de Almeida, J. O., Pessoa, S. B. & Covello, A. A reação quantitativa de fixação do complemento na bouba. [**Quantitative Complement-Fixation Reaction in Yaws**] *Hospital.* Rio de Janeiro. 1953, Mar., v. 43, No. 3, 373–80. [10 refs.]

The authors contrast a recommendation of the WHO First International Symposium on Yaws Control in Bangkok, March, 1952, that simple serological methods which can be carried out by persons not specially trained should be used, with that made in October, 1950, by a WHO Sub-Committee on Serology and Laboratory Aspects which stressed that on account of the many errors that can arise in flocculation methods they should be placed only in the hands of sufficiently trained serological specialists. These tests also give many non-specific reactions especially in leprosy patients. Where yaws is endemic leprosy also is present. Complement-fixation tests have been shown to give few such false results.

The authors feel that a quantitative serological test, in which a cardiolipin antigen is used, would assist in the control of the treatment of yaws, which is of special importance now that penicillin is being used.

The sera from 27 yaws patients at the Prophylaxis Unit at Palmeira-dos-Indios, State of Alagoa, Brazil, were studied. From these, as far as possible, syphilis could be excluded. The standardized quantitative test of the N.Y. State Department of Albany described in " Standard Methods 10 " was used.

The following table summarizes the results:

	Total	Negative	Positive (titres) <10	10–50	>50
Untreated	16	0	1	4	11
Under treatment	4	0	0	2	2
Clinically cured	7	3	4	0	0

A woman aged 28 years with a primary lesion gave a titre of 21·5 after 8·5 million units of penicillin and a man aged 19 who had ulcerative yaws lesions 4 years previously was serologically negative after 1·2 million units. [No record is made of the time between treatment and the serological tests in those that had been tested.]

It is stressed that repeated serological examination would be of great value in handling clinically cured patients in whom clinical relapses could thus be forestalled.

The authors concude that in Yaws Prophylaxis Services serological control with a standardized quantitative technique should be obligatory.

[The apparent conflict to which the authors call attention is probably due to mass treatment being of importance in yaws while individual treatment was the purpose of the earlier recommendation. In anti-yaws campaigns using procaine penicillin serological examination has little place except in specially selected research areas in which knowledge is sought for application in the main campaign. The occurrence of Lutz-Jenselme nodes in a mulatto girl aged 12 (Case A.4), who had yaws in infancy and on whom pianides were present at the time of the examination, would be unusual in Africa.] *C. J. Hackett*

LEPROSY

Davison, A. R. **Leprosy in South Africa.** *South African Med. J.* 1953, Aug. 8, v. 27, No. 32, 659–61.

This very instructive report describes the advance that has been made in the control of leprosy in the Union of South Africa since 1915. The measures taken, principally since the transfer in 1919 of leprosy institutions from the Department of Interior to the Department of Public Health, have resulted in the discharge since then of over 12,000 patients. The incidence of leprosy in the Union of South Africa is now estimated to be 0·77 per 1000 compared with 5·5 and 11·5 per 1000 computed in the neighbouring countries of Southern Rhodesia and Swaziland.

Patients are segregated in 5 different institutions, being sent to those nearest to their homes. The expenses of visiting relatives are defrayed by the government, and the patients are given the best treatment and many amenities, with the result that they now are admitted, on an average, 2 years after the beginning of the disease instead of 10 years as formerly. At Westfort, in the Transvaal, the largest of the institutions, after 5 years of the use of sulphones the annual "death rate" [presumably the actual number of deaths] has been reduced from 94 to 49 [the number of patients in the institution is not given]. Patients in whom there have been negative results at 12 examinations at intervals of one month are discharged, but are kept under inspection for 6 years.

It was found that 40 per cent. of those admitted to Westfort had no knowledge of leprosy, and 80 per cent. did not know of the existence of the institutions. Now this ignorance has been removed and patients come earlier, are physically fitter, and recover with fewer deformities. The cost of segregating patients is still £250,000 yearly, but the Union is fortunate in being able to afford this expenditure. Several drugs are under trial at present in experiments under the control of the Leonard Wood Memorial of America. *Ernest Muir*

Landau, J., Bachrach, U. & Gurevitch, J. **The Bacterial Flora of the Conjunctiva of Leprous Patients.** *Acta. Med. Orientalia.* 1953, July–Aug., v. 12, Nos. 7/8, 226–9.

"The bacterial flora of the conjunctivae of leprous patients was studied during 3 different seasons. The results were similar to those obtained from conjunctivae of healthy people. Variations were observed in the seasonal frequency of Staphylococcus albus and Corynebacterium pseudodiphteriticum which were the predominant organisms isolated. The details of these findings were compared with the results obtained in healthy people and were discussed."

Corcos, M. G. **Human Lepra Bacilli exposed to Sunlight will retain their Acid Fastness if they are First Heated.** *Leprosy Review.* 1953, July, v. 24, No. 3, 165–9.

It was found that leproma smears exposed to sunlight for 24 hours showed when stained, practically no bacilli, while similar smears from the same patient which had been boiled before exposing to sunlight, and similar smears which had not been exposed to sunlight, showed bacilli in large numbers. The author expresses the hope that this phenomenon will be further investigated, especially by electron microscopy. *Ernest Muir*

Gonzales Prendes, M. A., Fors Carbonell, A., Pardo-Castelló, V. & Curbelo Hernandez, A. La microscopia fluorescente en leprologia. Valoracion del metodo fluorescente frente al Ziehl-Neelsen en el diagnostico bacteriologico. [**The Fluorescence Microscope in Leprology. Comparison of the Value of the Fluorescence Method with that of Ziehl-Neelsen in Bacteriological Diagnosis**] *Internat. J. Leprosy.* New Orleans. 1953, Jan.–Mar., v. 21, No. 1, 35–40. English summary (9 lines).

Certain substances, such as auramine, have the power when they are illuminated of transforming the wave-length of the light received and transmitting light of a different wave-length. By applying this principle to the examination of smears taken from leprosy patients and staining them with auramine O, 100 cases were examined, similar smears stained by Ziehl-Neelsen being examined as controls. With the fluorescence technique 75 were positive, but with Ziehl-Neelsen only 30 were positive. The technique of preparing and using the auramine stain are described. A 300- or 500-watt lamp is used to generate sufficient ultraviolet rays. A blue filter is placed in front of the lamp, and a yellow filter is placed above the ocular of the microscope. *Ernest Muir*

Mauzé, J. & Arnaud, G. Granulogramme de Benda et vitesse de sédimentation dans le lèpre. [**The Granulogram of Benda and the Sedimentation Rate in Leprosy**] *Méd. Trop.* Marseilles. 1953, May–June, v. 13, No. 3, 355–6.

Dividing polynuclear leucocytes into 3 classes, normal, intermediate and pathological, the authors made counts in 48 leprosy patients. [The " granulogram ", as described by Benda in 1945 is a formula for polymorphonuclear leucocytes classified according to the changes in size and number of their granules.] In these patients they found the granulogram (appearance of the neutrophiles) pathological in 29, intermediate in 15 and normal in 4. Among the 35 lepromatous cases 21 granulograms were pathological; among the 7 tuberculoids 5 were pathological; and among the 6 indeterminates 3 were pathological. The sedimentation rate was increased in 85·5 per cent. All the increased sedimentation rate results corresponded with the pathological granulograms. [The authors do not mention the stage of leprosy from which their patients were suffering, or whether there were any septic or other complications. It is well known that, except when leprosy is in an advanced condition or is complicated, the sedimentation rate is not affected by the leprosy infection alone to any great extent.]

Ernest Muir

Ross, Hilary & Gemar, F. **The Kahn Universal Serological Reaction in Leprosy.** *Internat. J. Leprosy.* New Orleans. 1953, Jan.–Mar., v. 21, No. 1, 27–34, 4 figs.

The main object of this paper is to show the effect of sulphone treatment on the reaction of patients to the Kahn universal serological test. The test is based upon the concept that serological reactions with lipid antigen in varying concentrations of saline, and with different periods of ice-box incubation, form distinctive patterns in health and in a few diseases such as syphilis, yaws, leprosy, tuberculosis and malaria. Kahn is of the opinion that in lepromatous leprosy the serological pattern is distinctive and entirely different from those of syphilis and yaws [this *Bulletin*, 1951, v. 48, 997]. The authors tested out the Kahn universal test in 130 cases of leprosy, with 20 non-leprous employees and 5 known cases of syphilis as controls. Patterns are shown by means of graphs in 49 leprosy cases with negative serodiagnostic reactions, in 71 with positive serological reactions, and in the 5 known cases of syphilis. Lastly the changes of pattern produced 4 years later after treatment with sulphones in 10 cases are shown. From the results it is concluded that there is no distinctive serological pattern in lepromatous leprosy, but that sulphone treatment can alter the type of the pattern in lepromatous leprosy, and that this test may be of prognostic value.

Ernest Muir

Mitsuda, Kensuke. **Atlas of Leprosy.**

This book is reviewed on p. 1180.

Chaussinand, R. **The Classification of Leprosy with a Primary Division into " Benign " and " Malign " Classes.** *Internat. J. Leprosy.* New Orleans. 1953, Jan.–Mar., v. 21, No. 1, 1–10.

In putting forward this form of classification the author stresses the fact that leprosy control is extending year by year throughout the world, but

that, the number of qualified specialists being inadequate, control is possible only through the properly organized cooperation of the whole medical profession. He therefore proposes a simple form of classification suitable for those who are not experts, but which can be expanded into a more detailed secondary classification by those who wish to specialize more. The primary classification takes cognizance of benign and malign leprosy corresponding to the present tuberculoid and lepromatous types, and based upon clinical and bacteriological examination and the lepromin test. The secondary classification subdivides the benign into tuberculoid (T) and indeterminate (I), the malign form containing only lepromatous (L). The tuberculoid is again subdivided into minor (T′), major (T″) and borderline (BT).

After thus classifying these forms of leprosy the physician may proceed to the *state of the disease*: slight (1), moderate (2) or advanced (3), the numbers being placed after the letter c or n, (indicating cutaneous or neural). Next is the *degree of activity of the disease*: florid (f), quiescent (q) or residual (r), these letters being placed immediately after T, I or L. Fourthly, the absence or, if present, the degree of *reaction* is noted, indicating by single or double underlining (or by putting in italics) the rest of the symbols. Lastly, the results of bacteriological examination are indicated by + or −, first for the nasal mucosa and then for the skin. The following example illustrates the classification: Lf3c(pm)3n++. This indicates advanced florid, cutaneo-neural lepromatous leprosy in a pronounced state of reaction, with numerous extensive and very marked skin lesions (nodules, infiltrations and macules) and very extensive neural lesions; bacteriological examination positive for both nasal mucosa and skin lesions. *Ernest Muir*

Birrell, J. H. W. **A Note on Leprosy as an Aetiological Factor in the Weber-Christian Syndrome.** *Med. J. Australia.* 1953, July 4, v. 2, No. 1, 7.

A Maltese patient was diagnosed as suffering from the Weber-Christian syndrome, a condition characterized by recurrent bouts of fever with single or multiple crops of tender or painless inflammatory nodules in the panniculus adiposus (superficial fascia). In a second Maltese patient with similar symptoms staining of a biopsy specimen by the Ziehl-Neelsen method showed typical *Myco. leprae*, and re-examination of the former patient showed the same organisms. A description is given of the histological findings, typical of lepromatous leprosy, but confined (apparently) to the adipose tissue. "The implication of the foregoing is that the Weber-Christian syndrome is only a syndrome and not a specific disease, and that leprosy may well be one of the aetiological agents." *Ernest Muir*

Mancy, E. S. **Report of Two Cases of Leprosy.** *Med. J. Australia.* 1953, July 4, v. 2, No. 1, 20–21, 1 fig.

Two typical cases of lepromatous leprosy in Maltese patients are described (with a photograph of one), and the differential diagnosis to be observed in Australia is mentioned, while attention is drawn "to the fact that leprosy must be considered in the differential diagnosis of atypical skin and nerve conditions in migrants, particularly those from the Mediterranean basin". [Apparently these are the same patients as those described above.] *Ernest Muir*

Dharmendra & Chatterjee, S. N. **A Case of Reactional Tuberculoid Lesions wrongly diagnosed as Cellulitis.** *Leprosy in India.* 1953, July, v. 25, No. 3, 212–14, 3 figs. on pl.

Guadagnini, M. **Lepromatous Neuritic Lesions, their Great Incidence in certain Sensory and Motor Branches, and the Treatment.** *Leprosy Review.* 1953, July, v. 24, No. 3, 147–55, 8 figs.

A description is given of operations for decompression and neurolysis in lepromatous neuritis. The nerves affected were the ulnar 103, the external popliteal 24, the median 15 and the posterior tibial 4. The pain-removing effect in all cases above the hypertrophied part of the nerve was immediate, and in the parts supplied by the nerves there was diminution or disappearance of pain in 50 to 55 per cent. There were 24 relapses. The technique of the operation is described and illustrated in 8 photographs.

Ernest Muir

Dharmendra & Chatterji, S. N. **Routine Use of Yeast and Iron not necessary during Sulphone Treatment of Leprosy.** *Leprosy in India.* 1953, July, v. 25, No. 3, 194–8.

It was found that in non-lepromatous cases of leprosy treatment with DDS, in doses of 100 mgm. daily and given orally, does not produce any marked haematological changes even on prolonged administration. In most cases there is a slight reduction of the number of erythrocytes and of haemoglobin in the first 6 to 12 weeks, and in some there is a similar fall about 6 to 12 months after the beginning of treatment. But both these are followed by complete or almost complete restoration. It was found that the addition of yeast, or of yeast and iron, did not change the course of events to any appreciable extent. Further experiments are being made with lepromatous cases. *Ernest Muir*

Ramanujam, K. **Treatment of Leprosy with "Sulfon-Cilag".** *Leprosy Review.* 1953, July, v. 24, No. 3, 156–64, 4 figs.

Sulphon-Cilag is DDS with a sodium acetate group added. The molecule contains 75·6 per cent. of DDS and the substance is soluble in water. Fourteen patients were divided into 3 groups, 6 patients being given 5 cc. of a 10 per cent. solution intravenously 6 days a week, 4 patients 10 cc. twice a week subcutaneously, and 4 patients 5 cc. daily subcutaneously. Out of the patients treated there was severe neuritis in one, severe lepra reaction in 2, and moderate anaemia in 1. The bacteriological and clinical results are recorded. There seemed to be no advantage in the intravenous route over the subcutaneous, or in the daily over the twice-weekly administration. Clinical changes are illustrated with 4 photographs.

Ernest Muir

Davidson, W. S. **An Evaluation of New Treatments and other Factors in Leprosy.** *Leprosy Review.* 1953, July, v. 24, No. 3, 139–46.

For this evaluation 5 groups of leprosy patients were treated with various new forms of treatment, 121 cases for 1 year, and a further series of 12 for 2 years. The treatments reviewed were Sulphetrone intramuscularly, 4 cc.

of a 50 per cent. solution twice weekly; Sulphetrone by mouth, 3 gm. daily; DDS 200 mgm. daily; Neustab (Thiacetazone), 25 mgm. daily rising to 200 mgm. in the course of 12 months; Neustab, rising to 200 mgm. daily in 3 months.

A somewhat complicated method is used for estimating improvement, based on clinical and bacteriological amendment, on the amount of reaction, and on the increase of the percentage of haemoglobin. Neustab 200 mgm. daily gave best results. Intramuscular Sulphetrone and DDS in a much larger series gave equal results, but not quite as good as Neustab. Oral Sulphetrone gave relatively poor results. Intramuscular Sulphetrone was the least toxic and Neustab the most toxic. Neustab in the smaller doses was ineffective and was associated with low haemoglobin. Haemoglobin above 13 gm. is necessary to obtain the best result from treatment. Underdosage is associated with a fall in haemoglobin more than full dosage. No significant advantage was shown as regards improvement between lepromin-positives and negatives. [The number of tuberculoid cases is shown in a table as 24, and the number of lepromatous as 97, while 41 are shown as lepromin positive; this needs explaining, as it is uncommon for lepromatous cases to be lepromin-positive.] *Ernest Muir*

Humphry, A. H. **Treatment of Leprosy with Thiosemicarbazone and DDS: a Comparative Series among Australian Aborigines.** *Internat J. Leprosy.* New Orleans. 1953, Jan.–Mar., v. 21, No. 1, 11–16.

The relative effects of thiosemicarbazone and DDS were assessed in Australian aborigines. Ten patients who had not benefited from other forms of treatment failed to respond to thiosemicarbazone and did not give the favourable results mentioned by Ryrie [this *Bulletin*, 1950, v. 47, 1101]. Fourteen new patients on this drug also failed to respond, while a similar number on DDS gave much better results. The author is unable to give any reason why this particular kind of patient should benefit less from this drug than other patients elsewhere. *Ernest Muir*

Buker, R. S. **Clinical Trial of Thiosemicarbazone.** *Internat. J. Leprosy.* New Orleans. 1953, Jan.–Mar., v. 21, No. 1, 17–20.

The object of the experiment was to find the most suitable drug for treating leprosy in the villages of Thailand, as 90 per cent. of those with leprosy live in the villages. Two groups of 60 patients each were treated with daily doses of thiosemicarbazone of 25 to 150 mgm., the one group in the central institution and the other group in a whole village. The impression was gained that the improvement achieved was as good with 75 mgm. as with 150 mgm. doses. Every fourth week the treatment was suspended. The improvement was considered similar to that obtained with DDS given to 98 patients in daily doses of 100 mgm., and to 10 patients in daily doses of 200 mgm. over a period of 18 months. The impression was gained that there was more lepra reaction in the DDS patients, especially among those getting 200 mgm. half of whom showed reactions. [This is perhaps not to be wondered at as the larger doses are generally considered to be excessive. The thiosemicarbazone does not appear to have produced the toxic symptoms reported by Lowe [this *Bulletin*, 1953, v. 50, 126], but as the author says, the number of patients actually getting the larger dose was not very great.] *Ernest Muir*

Lowe, J. **The Treatment of Leprosy with TB1/698. Interim Report based on Two and a Half Years Experience.** *Leprosy in India.* 1953, July, v. 25, No. 3, 188–93.

This report is based on the treatment of 197 cases for periods up to 29 months. TB1/698 was given orally twice daily for 6 days a week, beginning with 50 or 100 mgm. a day, increased after a few days to 100 or 150 mgm. and then after another few days to 150 or 200 mgm. (according to the weight and physical condition of the patient). There was a group of 69 lepromatous patients on TB1 from the start, of whom 2 died, and in 3 it had to be stopped, the rest tolerating the drug well. Of the 19 who had been treated from 10 to 20 months nearly all showed clinical improvement, 13 showed bacteriological improvement, and 4 became negative. In 62 tuberculoid cases the treatment had not been long enough to report, but clinical improvement was already marked in some, but in 3 treatment had to be stopped. There were also 58 patients who had been treated with sulphone, but had given some difficulty. The value of the change to TB1 in cases of intolerance to dapsone was very marked, " enabling chemotherapy to be renewed early instead of after a long period of desensitization to sulphone, which moreover may fail in its object ".

The conclusions are: that TB1/698 has been found a most useful therapeutic agent in leprosy, giving results closely parallel with those of sulphone, and in certain cases and certain circumstances possibly better results. Compared with DDS it has certain advantages and disadvantages. Of the latter: it has to be given daily or twice daily instead of only twice a week; it is several times more expensive; toxic effects, though less common, are more serious, acute agranulocytosis being the main one and occurring during the first few weeks of treatment [there were 3 cases in this series—see this *Bulletin*, 1953, v. 50, 126], so that during this period it is necessary to have close medical examination and laboratory facilities available. Otherwise TB1 is better tolerated than sulphones, fewer complications arise, and continuous treatment is more often possible. " There is reasonable ground for the expectation that TB1/698 will prove to be the best treatment yet tried for leprosy. Longer experience, and a study of relapse rates, are necessary before its place in leprosy treatment can be firmly established." Where there are adequate facilities it may be adopted as the standard treatment, but in most places DDS should be retained as the standard treatment, reserving TB1 for cases intolerant of DDS or in which DDS produces inadequate results. *Ernest Muir*

Fariñas, P. El tratamiento de la neuritis dolorosa hanseniana con tiosemicarbazona (TB1). [**The Treatment of the Painful Neuritis of Leprosy with Thiosemicarbazone (TB1)**] *Bol. Soc. Cubana de Dermat. y Sifil.* 1951, Dec., v. 8, No. 4, 164–72. [17 refs.]

A report is given of the treatment of 7 cases of leprosy with TB1, 4 of them being lepromatous, 2 tuberculoid and 1 indeterminate. All were suffering from more or less painful and acute neuritis, which had been treated without effect with various remedies. In all, the condition yielded rapidly and permanently to small doses of TB1, usually only 50 to 75 mgm. daily being given, occasionally 100 mgm. or more. The author suggests that perhaps this action may be non-specific and that this drug might perhaps be useful in other forms of neuritis. *Ernest Muir*

Chatterjee, K. R. & Bose, R. **A Simple Method of Estimation of Thiosemicarbazone in Tissue and Body Fluids.** *Leprosy in India.* 1953, July, v. 25, No. 3, 199–208, 2 graphs.

The authors have described a method for the estimation of *p*-acetylaminobenzaldehyde thiosemicarbazone the most commonly used of this type of compound in the treatment of leprosy. It consists in the extraction of the drug from tissues and fluids by means of amylalcohol, followed by hydrolysis to its aromatic and non-aromatic components by addition of hydrochloric acid in butanol. The aminobenzaldehyde portion is then separated by extraction with phosphoric acid and following diazotization is coupled with N-(1-naphthyl)-ethylene diamine. After allowing 30 minutes for colour development in the sample, the intensity is read in a photo-electric colorimeter and the amount present determined from a previously prepared curve. The method appears to be reliable and gives no false positive results in absence of the drug. Absorption and excretion was studied in a number of patients. After a dose of 50 mgm. by mouth the presence of thiosemicarbazone in blood and urine can be detected within an hour. Traces may persist in blood for 48 hours, and even longer in urine after a single dose. Excretion to the extent of 50 per cent. of the drug administered occurs in urine and to about 10 per cent. in faeces. The drug is also detectable in sweat, saliva, tears, milk and skin. *J. D. Fulton*

Williams, E. H. & Williams, P. H. **The Story of Kuluva.** *Leprosy Review.* 1953, July, v. 24, No. 3, 132–8, 1 diagram.

This is a story of a joint effort at leprosy control between a medical mission and the Local Government in the West Nile District of Uganda. The mission was interested in treating leprosy, but the land available was insufficient. Local Government in the District is being developed, so the formation of another leprosy village settlement, adjacent to that of the mission was set as a lesson in developing responsibility. The settlement consists of villages of some 50 patients, each with arable land round about in which the patients grow food. In the mission settlement the patients are given DDS tablets, but in the Local Government section it is considered wiser to inject the drug, as the patients are not under regular medical control and cannot be trusted to take tablets as instructed. It has been found however that by giving a suspension of DDS in normal saline there is little or no pain or induration, and the results are found comparable with those of the other settlement where the patients get 800 mgm. a week by mouth. The amount injected is moreover only 400 mgm. every second week. Also the patients attend more regularly for treatment when they have not to come so often. In the past 2 years some 900 patients have received treatment. An original method of preparing and injecting the suspension is described, by which it is possible to inject 100 patients in 15 minutes. The settlement is under the African Local Government, but the actual work is done by the District Team, which consists of the various Government Officers and Africans and one of the medical missionaries, sitting under the chairmanship of the District Commissioner. *Ernest Muir*

Fernández, J. M. M. El empleo del B.C.G. en la profilaxis de la lepra. [**The Use of BCG in Prevention of Leprosy**] *Bol. Soc. Cubana de Dermat. y Sifil.* 1951, Dec., v. 8, No. 4, 137–51. [29 refs.] English summary (9 lines).

In 123 children with negative tuberculin and lepromin tests intradermal inoculation with BCG produced positive lepromin tests in 91·8 per cent.

The author has since 1939 advised such inoculations in lepromin-negative subjects exposed to contact with leprosy. He has never seen the lepromatous form of leprosy develop in any contact thus inoculated. The author recommends that experiments be undertaken to determine the question: "does the positivity of the lepromin test induced by BCG have the same significance, as an expression of resistance, as that which occurs spontaneously?" [abstracter's translation]. He suggests the following experiments so as to gain a definite answer to this question: 1. Inoculation of rats with BCG to see if it attenuates their infection with rat leprosy. 2. A comparative epidemiological investigation of leprosy and tuberculosis to see if these two diseases are antagonistic to each other as they seem to be, comparing the amount of tuberculosis in an area endemic to leprosy with that in one where there is no leprosy. 3. A study of the amount of leprosy among those who have been vaccinated with BCG, compared with the amount of leprosy in those who have not. The author insists that a positive lepromin does not imply complete resistance to leprosy but only comparative resistance, and that there should not be expected a complete absence of leprosy among those inoculated, but rather a predominance of the benign forms of leprosy among those inoculated as compared with those who are not. It is also of great importance to ascertain whether the positive lepromin produced by BCG is permanent, or how long it persists.

Ernest Muir

Eisman, P. C., Geftic, S. G. & Mayer, R. L. **The Viability of** *Mycobacterium leprae murium* **in Tissue stored with Dry Ice.** *Internat. J. Leprosy.* New Orleans. 1953, Jan.–Mar., v. 21, No. 1, 73–4.

A number of organisms, including *Myco. tuberculosis* can be maintained by storage in dry ice, without loss of viability or appreciable alteration of virulence. The authors therefore studied the application of this principle to *Myco. leprae murium*, since, if it were successful, such a method would obviate the need to use fresh lepromatous tissue or to maintain a colony of "seed" animals for experimental infections.

On 3 occasions subcutaneous lepromatous tissues from rats or mice were excised and pieces placed in sealed pyrex test-tubes. Within 30 minutes, they were immersed in a "quick-freeze" bath of dry ice and acetone and stored in a dry-ice chest. At intervals of 1 to 42 weeks, samples were removed, thawed at 5°C. and prepared as 10 per cent. suspensions in distilled water. Penicillin was added to eliminate bacterial contamination and the suspensions were kept at room temperature for 2 hours before injection into clean rats and mice.

Groups of 2 to 10 mice or rats were inoculated subcutaneously with 0·5 to 0·75 ml. of each stored suspension and the animals were killed in 4 to 22 weeks (mice) or 24 to 34 weeks (rats).

In every case, the frozen tissues were capable of producing lepromata at the site of inoculation, with no apparent loss of infectivity; this held for lepromatous tissue frozen for the whole period up to 42 weeks. Palpable lepromata appeared in 3 to 4 weeks in mice and in 9 to 10 weeks in rats.

H. J. O'D. Burke-Gaffney

Millar, J. W. **An Attempt to confirm Growth of** *Mycobacterium leprae murium* **on Chorioallantoic Membrane of Live Chicken Embryos.** *Internat. J. Leprosy.* New Orleans. 1953, Jan.–Mar., v. 21, No. 1, 41–5, 1 fig.

This study is an attempt to confirm the claim of Noel and Marie-Suzanne [this *Bulletin*, 1949, v. 46, 945] that *Myco. leprae murium*

multiplies on the chorioallantoic membrane of the developing chick embryo and that, after 3 passages on membranes, the bacilli produced typical rat leprosy within 27 days after intratesticular inoculation. The organisms were found to suffer a marked loss of infectiousness during only 4 days on the membrane, and there was a continuous decline in the numbers of bacilli which could be recovered. It is pointed out that if murine leprosy bacilli had actually been adapted to the embryonic membranes then surely more than 3 passages should have been made. It is also mentioned that an interval of 27 days in rat testes is not evidence that typical rat leprosy has been caused by membrane-passed bacilli. *Ernest Muir*

Marie-Suzanne (Soeur), Noel, R. & Sohier, R. Étude comparative des lésions histologiques provoquées, chez le rat blanc, par inoculation du bacille de Hansen et de 25 souches de bacilles acido-résistants isolés à partir de lépromes humains. [**The Comparative Histological Study of Lesions Provoked in the White Rat by Inoculation with** *Myco. leprae*, **and with 25 Cultures of Acid-Fast Bacilli Isolated Originally from Human Lepromata**] *Ann. Inst. Pasteur.* 1953, June, v. 84, No. 6, 1042–5, 8 figs. on 2 pls.

There were 146 white rats inoculated with *Myco. leprae*. Of these 3 formed abscesses; 2 showed a mixture of tuberculoid and of lepromatous lesion at the point of inoculation. In all the others the histology showed a tuberculoid structure. The second experiment consisted in the inoculation of 26 cultures of acid-fast bacilli taken from human leprosy, 3 rats being inoculated with each culture. Ten of these cultures provoked nothing but a slight granuloma which disappeared within a month. Thirteen produced local lesions which remained till the 6th month, but were then found to be in marked retrogression. The culture " Chauviré " originally isolated by the author, alone gave a lesion similar in appearance to that of *Myco. leprae*. In the other cultures: 1. The presence of lesions was limited to the point of inoculation without tendency to spread, and there were abundant polymorphonuclears and zones of necrosis; 2. There were always nodules of histiocytes surrounded by a circle of lymphocytes with obvious penetration of lymphocytes to the periphery and to the histiocytes in the centre. On the other hand in the epithelioid caused by *Myco. leprae* (and the Chauviré culture) there was always a definite separation caused by a clear halo between the lymphocytes and the central mass of histiocytes. One culture (A.R.L. received from Florence) produced appearances somewhat resembling those of *Myco. leprae* and " Chauviré ". *Ernest Muir*

Chang, Y. T. **Chemotherapy of Murine Leprosy. I. The Use of Mouse Leprosy as the Chemotherapeutic Test.** *Internat. J. Leprosy.* New Orleans. 1953, Jan.–Mar., v. 21, No. 1, 47–56, 4 figs. on pl. [14 refs.]

The literature of the treatment of rat leprosy is reviewed, and the need of a more rapid method of testing the effects of drugs in this condition is pointed out. The author used intraperitoneal inoculation of a suspension of the bacilli (originally obtained from a rat nodule) into mice. A total of 872 mice was used without a single animal failing to develop macroscopic lesions, apart from a few that perished by accidents. The internal organs revealed marked leprous growth in the third or fourth month, and anti-leprosy activity of drugs could be clearly shown within 3 months, while no animal survived longer than 6 months. The following parts were affected: the subcutaneous tissue at the site of inoculation, the omentum,

pelvic fatty pads, the peritoneum, lymph nodes and thymus, spleen and liver. Other organs were only affected to a slight extent in the advanced stages. By making an index of the degree of infection of some 10 organs, examined at 4 intervals of a month each, it is possible to make a fairly accurate estimate of the effects of any drug tested. *Ernest Muir*

Chang, Y. T. **Chemotherapy of Murine Leprosy. II. The Effects of Streptomycin, Sulfones and Isonicotinylhydrazines on Mouse Leprosy.** *Internat. J. Leprosy.* New Orleans. 1953, Jan.–Mar., v. 21, No. 1, 57–71, 8 figs. on 2 pls. [23 refs.]

The method described in the last paper was used to evaluate the effects of certain drugs on rat leprosy in mice, drugs which have recently been used in the treatment of human leprosy. Four experiments are described: they involved different drugs or combinations of drugs in varying dosage. The results are shown in tables. The drugs were found effective in the following order of priority: Marsilid [iproniazid]; Nydrazid [isoniazid]; streptomycin combined with DDS; DDS; streptomycin; diasone. Streptomycin combined with DDS showed an additive effect. Penicillin appeared to have no effect on murine leprosy. A total of 640 mice were used in the experiments. *Ernest Muir*

HELMINTHIASIS

World Health Organization. Technical Report Ser. No. 65. **Expert Committee on Bilharziasis. First Report.** 45 pp. Geneva: 1953, July. [2s. 3d.; $0.30; Sw.fr. 1.20.]

One of the functions of this report is to facilitate epidemiological surveys and the diagnosis of individual and mass infections. Twelve pages are devoted to a detailed description and an analysis of diagnostic methods and their applicability under various conditions in the field is assessed. In the section on epidemiology the confusion regarding the status of vector snails, particularly in Africa, is noted and it is recommended that a committee of malacologists should be appointed by the WHO to undertake the identification of suspected snail hosts for health authorities and individuals in countries where bilharziasis is endemic. Attention is drawn to the almost complete lack of information on the bionomics and ecology of snail hosts. The variation in susceptibility of various species and strains of vectors to different strains of the parasite has been confirmed and it has been shown that it is a heritable characteristic.

Commenting on economic and social factors in the epidemiology of the disease, it is noted that there is at present no quantitative knowledge on the relation between infection and low productive capacity of the individual. A standard method of epidemiological survey for bilharziasis is described by which incidence, morbidity and mortality rates, and the geographical, malacological and human factors affecting transmission are measured.

Dealing with control it is stated that none of the numerous methods is entirely effective by itself. Several complementary measures should be employed together and they should be integrated into the health programme and general economy of the country. A successful control programme requires a minimum of 5 years. In the section on molluscicides sodium pentachlorophenate is reported as the most practical compound for use in

flowing water. At 10 parts per million it kills all stages of the snail including the egg, and it is safe and relatively cheap. When used against *Oncomelania* it must be sprayed on the moist surface where the colonies are living, but cyclohexyl-dinitrophenil was found to be even better in these conditions. This latter preparation, at a concentration of 3 to 5 parts per million, was effective against all stages of aquatic snails and had a residual effect lasting 2 to 4 weeks.

In the section on treatment it is pointed out that the parasite behaves so differently in different localities that treatment must be standardized for each parasite in each area. Miracil D hydrochloride is suitable for outpatient and mass treatments since it is given orally, but it has an unpleasant taste, is expensive, is valueless in *S. japonicum* infections and requires moderately high dosage to cure *S. mansoni*. In spite of its disadvantages sodium antimony tartrate is still recommended because of its efficiency and low cost; it is the most useful drug for treating *S. japonicum*. Treatment of infected human populations greatly reduces the severity of infections and the incidence of complications, but has little effect on the general incidence of the disease.

This pamphlet will prove very valuable to all who are concerned in the treatment and control of schistosomiasis. It summarizes the most recent information on these subjects, describes suitable diagnostic methods and records the information which should be collected in an epidemiological survey. Numerous gaps in knowledge of the transmission of the disease are indicated with an appeal for their investigation by persons having the opportunity. *T. H. Davey*

Pirajá da Silva, M. A. Estudos sôbre o "Schistosomum mansoni" (1908–1916). [**Studies on** *Schistosoma mansoni*, **1908–16**] 123 pp., 24 figs. 1953. Rio de Janeiro. [Commemorative edition, in honour of Prof. Pirajá da Silva's 80th birthday, obtainable free from Dr. Edgard de Cerqueira Falcão, Caixa Postal 796, Santos, S. Paulo, Brazil.]

In publishing a *Festschrift* to celebrate the eightieth birthday of Dr. Pirajá da Silva, Dr. Edgard de Cerqueira Falcão, his pupil, as a token of filial regard, has reversed the customary procedure and, in a booklet of 123 pages, has assembled reprints of his original papers on schistosomiasis in Brazil. These recall the times when the establishment of *Schistosoma mansoni* as a species distinct from *S. haematobium* was under discussion. This involved, as will be recollected, many of the great names of the day, some 45 years ago, including those of Sonsino, Patrick Manson, Sambon, Blanchard, Lutz, Looss, Holcomb and others.

Reproductions of portraits of Dr. da Silva, as he appeared when he did his chief work and as he is now at 80 years, show him robust and alert.

It is clear from the paper entitled "Study of Schistosomiasis in Bahia" (1908) in *Brazil Medico* that Dr. da Silva was the first to describe the morphological characteristics of what is now known as *Schistosoma mansoni*. His arguments were also based on the very cogent reason that *S. haematobium* does not occur in Brazil and in this contention he was supported by Wucherer, who was familiar with the latter in Egypt.

Although lateral-spined eggs were demonstrated in the faeces no schistosome ova had ever been found in the urine in Brazil.

In the *Arch. Parasitologie*, 1908, v. 13, 281, both male and female schistosomes are figured, depicting the arrangement of 7 testes in the former and the position of the lateral-spined ovum in the uterus of the latter. On the whole these original observations were correct, as subsequently proved by Professor R. T. Leiper.

The relative position of the ovary in the female of both species (*S. mansoni* and *S. haematobium*) is another feature which he recorded at this time.

It will be recalled that Sir Patrick Manson first described the lateral-spined egg in 1903 in the faeces of a patient from Antigua and in 1907 (*Proc. Zool. Soc.*, London, March 26) Sambon suggested that these eggs had been deposited by a new species for which he proposed the name of *S. mansoni*. It was stated by Sir Patrick Manson (*Tropical Diseases*, 1914, 3rd edition, 741) that Sambon was unable, from the material available, to furnish exact anatomical details of the new species.

Furthermore in *Arch. Parasitologie* (1912, v. 15, 398) Dr. da Silva described and figured a furcocercous cercaria as *Cercaria blanchardi* which he had discovered in *Planorbis bahiensis* Dunker and which clearly belonged to the group described by Max Lühe. Later, however, Lutz in 1917 found that the molluscan host was identical with *Pl. olivaceus*. The view that the cercaria described was a schistosome larva, and, in effect, that of *S. mansoni* now appears to be tenable, while the measurements made at this time tally with those generally accepted for the cercaria of this species.

In order to make the story complete the original papers by Sambon and the correspondence which ensued in the *Journal of Tropical Medicine and Hygiene* are reproduced.

Messages of congratulation from Sir P. Manson dated 25th June, 1909, from A. le Dantec in *Précis de Parasitologie Exotique* (1912, 3rd edition), and from Drs. Cesar Pinto and A. F. de Almeida (1948) in *Monografias do Instituto Oswaldo Cruz* are also published.

As is inevitable in a publication of this nature there is a good deal of repetition. *Philip Manson-Bahr*

Barbosa, F. S. & Dobbin, J. E., Jr. Estrutura interna dos *Australorbis* (Mollusca, Planorbidae) de Pernambuco e outros Estados. [**Internal Structure of *Australorbis* from Pernambuco and Other States of Brazil**] *Publicações Avul. Inst. Aggeu Magalhães.* Recife, Brazil. 1951–52, v. 1, 1–8, 3 pls. [21 refs.]

The English summary appended to the paper is as follows:—

"The radula and genital organs of *Australorbis glabratus* from the coast of the states of Pernambuco, Minas Gerais and Alagôas, are described. The authors pointed out the interest of a comparative study of the snails dissected in different regions of the country in order to make possible a definite identification of species or sub-species."

da Silva,, G. M. Formação das espiras de planorbídeos e suas aplicações gênero *Australorbis*. [**Formation of the Spires of Planorbids and its Significance in *Australorbis***] *Publicações Avul. Inst. Aggeu Magalhães.* Recife, Brazil. 1951–52, v. 1, 47–59, 7 charts. [10 refs.] English summary.

Barbosa, F. S. & da Silva, G. M. Curvas de crescimento de *Australorbis glabratus* e sua aplicação à epidemiologia e à profilaxia da esquistosomose. [**Growth Curves of *Australorbis glabratus***] *Publicações Avul. Inst. Aggeu Magalhães.* Recife, Brazil. 1951–52, v. 1, 35–42, 2 charts.

The English summary appended to the paper is as follows:—

"In an attempt to determine the growth curves of *Australorbis glabratus* fifteen snails from the same oviposition were isolated in separate small balanced aquaria and measurements made every day during the first two months. After that the snails were measured each week.

" After eleven months four snails were still alive. There was practically no growth during the embryonic development, slow growth within the first days of free living period and very rapid until they reach sexual maturity. Then, a gradual and slow increase in size occurred that stops only with the death of the snail.

" Very simple curves were obtained showing the increase in size and the number of whorls. Our data indicate that the age of a snail can more accurately be determined from the rate of growth of the whorls than the diameter."

Edwards, G. A., Magalhães Neto, B. & Dobbin, J. E., Jr. **Influence of Infestation and other Factors upon the Respiration of the Snail,** *Australorbis glabratus*. *Publicações Avul. Inst. Aggeu Magalhães.* Recife, Brazil. 1951–52, v. 1, 9–26, 3 figs.

Barbosa, F. S. & Dobbin, J. E., Jr. Resistência de *Australorbis glabratus* à dessecação em condições naturais. [**Resistence of** *Australorbis glabratus* **to Drying in Natural Conditions**] *Publicações Avul. Inst. Aggeu Magalhães.* Recife, Brazil. 1951–52, v. 1, 141–3.

Frankl, O. [**Early Intestinal Schistosomiasis**] *Harefuah.* Jerusalem. 1953, Aug. 16, v. 45, No. 4, [in Hebrew 83–4. English summary.]

The English summary appended to the paper is as follows:—

" (1) 19 boys between the ages of 11 and 25—all born in this country—were admitted to the hospital during the months June to September 1951. By clinical as well as by parasitological examination they were found to suffer from early intestinal *Schistosomiasis*. Ova of *Sch. mansoni* were found in the stools of 14 patients.

" (2) The clinical symptoms were fever (in 17 cases), urticaria (15), angioneurotic oedema (15), diarrhoea (14), loss of weight (12), abdominal pain (10), cough (9), malaise (9), anorexia (7), and headache (4).

" (3) Laboratory examinations disclosed moderate leucocytosis with pronounced eosinophilia in all patients.

" (4) All patients except two had typical changes in the X-ray picture of the lungs. 5 patients had hints of *cor pulmonale* at the time of the first X-ray examination (2–3 months after the supposed infection).

" (5) The first cases were treated with *Stibophen*, but owing to relapses Tartar Emetic was used in the later cases.

" (6) Follow up examinations after 15 months showed further development of the *cor pulmonale* in the 5 cases already mentioned. No similar cases were found in the literature.

" (7) All cases were thought to have acquired the infection by bathing in or working near the Yarkon river in the neighbourhood of Tel-Aviv. As up till now no cases of autochtonous infection with *Sch. mansoni* in Israel have been reported, it is thought that the infestation of the country's waterways may be due to importation of the parasites by new immigrants possibly from Yemen."

Roth, J. [**The Roentgenological Appearance of Pulmonary Schistosomiasis**] *Harefuah.* Jerusalem. 1953, Aug. 16, v. 45, No. 4 [in Hebrew 85–9, 5 figs. English summary 89.]

The English summary appended to the paper is as follows:—

" The increase of cases of schistosomiasis in the country represents a grave problem for the nation's health. It is, therefore, imperative to pay

more attention to its prevention. A brief account is given of the pathology and development of the pulmonary type of the disease in its early and more advanced stages. A general survey is given of the roentgenological appearance of the bilharzia-infested lungs: enlargement of the hilum, increased pulmonary markings, the development and distribution of pseudo-tubercular bilharzia-lesions in the form of small densities on the background of light haziness in the lower parts of the lungs, especially on the right. The classification of the bilharzia lesions in the lungs in their roentgenological appearance should be done according to the size, shape and localization.

"The early formation of a pulmonary heart is pointed out as a consequence of an increased blood pressure in the pulmonary circulation which is, in turn, caused by arterial damage.

"There is a special importance in diagnosing pulmonary schistosomiasis, in its distinction from other diseases and the need for a thorough search for cardiac and pulmonary involvement is stressed in every suspected case."

da Rocha, F. J. & Roedel, G. Um caso de esquistossomose medular. [**A Case of Schistosomiasis of the Spinal Cord**] *Rev. Assoc. Med. Minas Gerais.* 1952, Mar.–June, v. 3, Nos. 1/2, 23–6, 2 figs. English summary.

In July, 1949, a man of 28 years from Minas Gerais, Brazil, came to hospital complaining of numbness of his right foot, the left being similarly involved a month later. Ill-defined paraesthesia was found in the legs and extending up to the mammary region; the legs "felt weak and heavy" and there was some girdle pain in the chest. For 2 years he had had dysuria which he attributed to an old attack of gonorrhoea. His gait was paretic, especially the right leg, the leg muscles weak in action but hypertonic. There was marked hyperaesthesia in the legs, diminishing gradually up to the thorax; vibratory sense was barely perceptible in the feet but increased upwards and was normal at the level of the iliac crests. Spinal tumour was diagnosed. Laminectomy was performed from the 2nd (later extended to the 1st) to the 5th dorsal vertebrae; the spinal fluid which gushed out (*jorrou livremente*) contained 15 leucocytes per cmm. and both it and the blood showed 10 per cent. eosinophiles. The cord appeared to be enlarged and a small fragment of the white matter was taken for examination. It showed minute granulomata, with a periphery of leucocytes, eosinophiles and lymphocytes, a middle zone of epithelioid cells and in the centre an irregular formation and structures with lateral spines. The faeces were found to contain ova of *S. mansoni*.

Treatment by injections of Stibophen-Glaxo was adopted, 2 injections, each of 5·2 cc., for 2 days, one on the 3rd day and 3·0 cc. on the 4th day. A month later the faeces when examined revealed no ova. Immediately after the operation the patient showed flaccid paralysis of both legs and incontinence of urine and faeces; in short, the immediate post-operative state was worse than before, ascribed to the local oedema of the cord due to taking of the biopsy specimen. Then improvement gradually set in and by March, 1951, he was able to walk with the aid of a stick. [Confession is said to be good for the soul and the authors call attention particularly to the lack of fundamental examination before operation. The faeces had not been examined because those in charge of the institution where the patient had been admitted "depended on the goodwill of colleagues for the simplest

examinations " [abstracter's translation]; the spinal fluid had been tapped, but the specimen was lost and " the resistance of the patient prevented a fresh collection ".] *H. Harold Scott*

Gindy, M. S. **Preliminary Report on Factors affecting the Stability of Copper Sulphate Solutions in Nile Water.** *J. Roy. Egyptian Med. Ass.* 1953, v. 36, No. 4, 309–12.

Copper sulphate has been reported to be an effective molluscicide yet its application over a long period of time has not, in Egyptian experience, resulted in permanent reduction of the number of snail hosts of human schistosomes. A variety of factors have been suggested to account for this reduction in certain waters of the potency of copper sulphate. Some laboratory experiments are described in which the concentration of soluble copper in waters was measured colorimetrically by the sodium diethyldithiocarbamate method, at intervals after the introduction of a measured dose of copper sulphate. An initial amount of 30 p.p.m. of copper sulphate was reduced to 19·6 p.p.m. after 1 hour in Nile water, to 15·7 p.p.m. in silty Nile water. After 72 hours only 3·9 p.p.m. were left in Nile water and 0·4 p.p.m. in silty Nile water. In further experiments in which 5 p.p.m. of tartaric acid or of citric acid were added, it was found that these acids had some " stabilizing " effect in that the copper sulphate concentrations were reduced to a lesser extent and were 10·2 p.p.m. after 72 hours in Nile water with tartaric acid addition and 13·8 p.p.m. with citric acid.

M. E. Delafield

Magalhães Neto, B. Determinação colorimétrica do pentaclorofenato de sódio na água. [**Colorimetric Determination of Sodium Pentachlorophenate in Water**] *Publicações Avul. Inst. Aggeu Magalhães.* Recife, Brazil. 1951–52, v. 1, 43–6, 2 graphs.

The amount of sodium pentachlorophenate in water was determined colorimetrically, with a filter of 580 millimicrons in the Lumetron, model 400 G. colorimeter. The method is described and the results shown in a graph.

Cattan, R., Frumusan, P. & Lumbroso, P. Hémiplégie transitoire, épisode initial d'une distomatose hépatique. [**Transitory Hemiplegia on the First Manifestation of Liver Fluke Disease**] *Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1953, Nos. 19/20, 676–9.

Osimani, J. J. Ineficacia del ácido iodoalfiónico en la cura radical de la teniasis. [**Inefficiency of Iodo-alphionic Acid in Taeniasis**] *Archivos Uruguayos de Med., Cirug. y Especialidades.* 1952, Nov.–Dec., v. 41, Nos. 5/6, 275–81. English summary.

The preparation known as iodo-alphionic acid goes also by the names of Periodax, Feniodol and Biliselectan, and has the composition beta-(4-hydroxyl-3,5-diiodiphenyl-alpha-phenyl propionic acid. It has been recorded as a useful and effective anthelmintic in infections by *T. saginata*. The régime of administration is as follows: after a light breakfast no more food is taken until 7 p.m. when a cup of coffee with milk and " a small quantity of quince jelly " is given; no bread or biscuits or alcohol. One hour later

2 tablets, each of 0·5 gm., of the drug are given and this dose is repeated every 5 minutes till 6 gm. have been taken; relatively smaller doses are given to children. If no motion is passed by the following morning (in some patients the drug seems to cause diarrhoea) a saline purgative is given. Usually the drug is well tolerated; some complain of pyrosis or moderate griping, but of 19 patients referred to only one reacted badly with headache and vomiting persisting for 24 hours. The 19 are briefly detailed. One, a child of 3 years, was given only 4 tablets; the ages of the others ranged between 10 and 50 years; 6 whose ages were 10, 12, 15, 15, 17 and 19 years respectively received a total of 5 gm., the other 12 had the full dose of 6 gm.

The results were far from satisfactory. In 2 cases only was cure obtained; 7 others expelled " several metres " of the cestode, but reappearance of proglottides later showed that the scolex had not passed; in the remaining 10 there was no effect. *H. Harold Scott*

Cicchini, T. Considerazioni epidemiologiche e cliniche su alcuni casi di imenolepiasi da *Hymenolepis nana* osservati dal 1945 al 1951. [**Epidemiological and Clinical Observations on Some Cases of** *Hymenolepis nana* **Infection in 1945–1951**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1953, June, v. 34, No. 6, 311–18. [17 refs.]

The English summary appended to the paper is as follows: —

" In about 11,000 stool examinations, performed from 1945 to 1951 in the Clinic of Tropical and Subtropical Diseases of the University of Rome, the author has observed 38 cases of individuals infected by *Hymenolepis nana*. The greatest part of them (29 cases) came from Latium.

" These subjects, most of whom were male children, complained of various intestinal disorders, but the diagnosis of infection by *H. nana* was possible only after the stool examination.

" From another investigation, systematically carried out on statistical basis on 150 children living in the community of Meta di Sorrento, the presence of *H. nana* was ascertained in 7 cases."

Náquira V., F., Zipper A., J. & Neghme R., A. Encuesta para investigar la frecuencia de la hidatidosis humana en la provincia de Valdivia (Comunas de Lanco y Panguipulli). [**Study of the Incidence of Hydatid Disease in Man in the Province of Valdivia, Chile**] *Bol. Informaciones Parasitarias Chilenas.* 1953, Jan.–Mar., v. 8, No. 1, 7–8.

The English summary appended to the paper is as follows: —

" A serological and skin-test survey was undertaken in rural areas of the province of Valdivia, in the South of Chile with the purpose to investigate sub-clinical cases of hydatid disease. 2,691 individuals were examined using Casoni's test, Ghédini Weinberg reaction and/or the conditioned hemolysis test. 327 individuals gave a positive result to one or all of the tests (13·8%).

" The radiologic study of these cases confirmed 1 case of pulmonary hydatid disease, and 6 diaphragmatic deformities suspicious of hepatic hydatid disease."

Grundmann, A. W., Butler, J. M. & Selin, Merle J. **Examination of Commercial Silver Fox as a possible Host for** *Echinococcus granulosus* **(Batsch 1786) Rudolphi 1805 in Salt Lake County, Utah.** *J. Amer. Vet. Med. Ass.* 1953, Sept., v. 123, No. 918, 235–6.

Lima, L. I. de A. & Barbosa, F. S. Considerações em tôrno de um caso de singamose humana. [**A Human Case of** *Syngamus laryngeus* **Infection**] *Publicações Avul. Inst. Aggeu Magalhães.* Recife, Brazil. 1951–52, v. 1, 27–34, 2 figs. [17 refs.]

The English summary appended to the paper is as follows:—

"A case of gapeworm infection of man is reported. The patient was a nun subjected to frequent coughing spells.

"A pair of worms, *Syngamus laryngeus* Railliet, 1899, was expelled during a violent coughing spell and the patient became cured.

"This case is considered to be the 15th published instance of human gapeworm infection and the 5th known from Brazil."

Young, M. D. **Microfilariae and Trypanosomes found in a Blood Survey of Liberia.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1953, July, v. 47, No. 4, 346–9.

In 1948 the author collaborated with Dr. T. H. Johnson in a survey made to determine the prevalence of malaria in Liberia. During the course of this survey thick and thin blood films were made from more than 10,000 persons, and the results of the examination of these films for malaria have already been published [this *Bulletin*, 1950, v. 47, 428]. The object of the present report is to give the prevalence of microfilariae and trypanosomes found in the same films.

"(1) In a survey of Liberia the prevalence of microfilariae in blood smears made at night was 4·3 per cent. for all ages, and for adults only, 6·0 per cent.

"(2) *Wuchereria bancrofti* was the only filariid species identified. Infections were found in every general area, and in all except four villages, where examinations were made. The heaviest foci appear to be on the coast.

"(3) Only five slides, 0·05 per cent. of the 10,128 examined, showed trypanosomes."

[The absence of microfilariae, other than those of *W. bancrofti*, is interesting. The members of the Harvard Expedition which visited Liberia in 1926–27 (this *Bulletin*, 1931, v. 28, 258) examined 105 Africans, 92 at night, and found *W. bancrofti* in 2 instances, *D. perstans* in one and *L. loa* in one.] *R. M. Gordon*

Neves, H. de A. & Scaff, L. M. Microfilaremia congênita. [**Congenital Microfilaraemia**] (Nota prévia). *Rev. Brasileira Malariologia.* Rio de Janeiro. 1952, Oct., v. 4, No. 4, 415–25, 4 figs.

The English summary appended to the paper is as follows:—

"The authors report in their search for microfilariae among new-born babies whose mothers harbored large numbers of *Wuchereria bancrofti* embryos.

"Up to the present, 47 babies were examined and microfilariae were found in 2 of them, aged 3 and 10 days respectively. In both cases only 1 embryo was found in 20 cmm of blood and repeated examinations made later yielded negative results."

Fros, J. & Liqui Lung, M. A. V. **Sheathless** *Microfilaria bancrofti* **and Eosinophilic Granulocytes.** *Documenta Med. Geograph. et Trop.* Amsterdam. 1953, June, v. 5, No. 2, 116–22, 5 figs.

Observing that microfilariae of *W. bancrofti* in a patient in Surinam with 25,000 per ml. emerged from their sheaths in thick films which had been

stored overnight in a damp atmosphere (the relative degree of humidity varied between 92 to 95), it was decided to undertake further experiments on the point. In moist blood films the majority of the microfilariae emerged from their sheaths after an interval of 2–6 hours. Experiments made on the same lines with fluids of different osmotic pressures indicated that it is improbable that osmotic changes have any effect. Experiments also showed that many eosinophilic granules had clustered round some of the microfilariae which were completely or partially free. Sometimes these eosinophile accumulations were so dense that scarcely anything of the microfilariae could be seen. In other instances eosinophilic granulocytes were found clustering round the part of the microfilariae which protruded from the sheath. In *Mansonella ozzardi* and *Dipetalonema perstans* embryos this phenomenon was not observed.

It is recalled that Bergman in 1932 (*Gen. Tydschr. v. Ned.-Indië*, v. 72, No. 15) observed that lymphocytes lying near the microfilariae changed into eosinophilic granulocytes. *Philip Manson-Bahr*

Ferreira, M. de O. & Ferraz, D. M. Contribuição ao conhecimento dos transmissores da filariose bancroftiana no Brasil. [**Note on Vectors of *W. bancrofti* in Brazil**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1952, Oct., v. 4, No. 4, 413–14.

The English summary appended to the paper is as follows:—

"The authors found 8·51% of *Culex fatigans* naturally infested by *Wuchereria bancrofti* at Ponta Grossa ("Município" of Florianópolis, Santa Catarina State)."

Faiguenbaum A., J. Triquinosis y cortisona. [**Trichinosis and Cortisone**] *Bol. Informaciones Parasitarias Chilenas.* 1953, Jan.–Mar., v. 8, No. 1, 9–11, 1 chart.

The English summary appended to the paper is as follows:—

"The bibliography on the effect of Cortisone in human Trichinosis is reviewed and data of one case successfully treated is given."

DEFICIENCY DISEASES

Homawala, K. S. **Average Heights and Weights of School Children in Karjat Taluka, Kolaba District.** *Indian J. of Child Health.* 1953, May, v. 2, No. 5, 208–12, 6 figs.

The paper records heights and weights of 1,248 children in 8 schools in India. The records are compared with standards and the children shown to be very undersized. The value of shark liver oil and milk in supplementing the diet of school children is stressed. *R. Passmore*

Parent, M. & Massardo-Raymaekers. Expérience d'alimentation complémentaire faite dans une consultation de nourrissons. [**Supplementary Feeding in an Infant Clinic**] *Ann. Soc. Belge de Méd. Trop.* 1953, Feb. 28, v. 33, No. 1, 57–66, 2 charts.

Debilitated and underweight children in the Belgian Congo were given a daily supplement to their diet consisting of arachis oil 11·5 gm., sugar

7·5 gm., maize flour 4·5 gm., powdered skimmed milk 25 gm. (containing 9·1 gm. of protein and with a calorific value of 238·5). Ten children aged 10 to 20 months, who were on the average 1·925 kgm. below the standard weight for their age received this supplement daily for 22 months. They were then only 1·540 kgm. below standard and so had made good 385 gm. of the original deficit. Another group in better general condition made good 605 gm. of an original average deficiency of 2·01 kgm. when receiving the supplement. *R. Passmore*

Lal, S. B. **The Effect of Pressed Ground-Nut Cake Flour in supplementing Rice Diet.** *Indian J. Med. Res.* 1952, Oct., v. 40, No. 4, 471–9.

One oz. of ground-nut cake, made up with rice flour and vegetable fat, was given daily for 6 months to a group of boys aged 6 to 14 years in an orphanage in Patna. Another group of boys received a supplement of one oz. of skimmed milk powder and a third remained on the normal diet of the institute. This was a poor rice diet. Whereas during the period the control group gained only 0·7 lb. in weight, those receiving ground-nut cake and skimmed milk gained 7·4 and 5·1 lb. respectively. Haemoglobin percentages were also increased. The possible practical value of ground-nut cake in children's diet is discussed. *R. Passmore*

HAEMATOLOGY

Singer, K. & Fisher, B. **Studies on Abnormal Hemoglobins. VII. The Composition of the Non-S Hemoglobin Fraction in Sickle-Cell Anemia Bloods.** A Comparative Quantitative Study by the Methods of Electrophoresis and Alkali Denaturation. *J. Lab. & Clin. Med.* 1953, Aug., v. 42, No. 2, 193–204, 4 figs. [23 refs.]

"A comparative study, by means of electrophoresis and alkali denaturation, of the non-S hemoglobin fraction of typical sickle-cell anemia hemolysates was performed. It could be shown that this fraction is almost entirely composed of the alkali resistant fetal (F) hemoglobin. Whether small amounts of normal adult (A) hemoglobin also exist in this fraction cannot be definitely decided due to the relative insensitivity of the methods employed. For practical purposes, the quantity of S hemoglobin in typical sickle-cell anemia hemolysates may be expressed as the difference between the total hemoglobin and the percentage of the F pigment. Two atypical cases of sickle-cell disease whose bloods contain relatively large amounts of A and F pigments, besides S hemoglobin, are presented."

Smith, E. W. & Conley, C. L. **Filter Paper Electrophoresis of Human Hemoglobins with special reference to the Incidence and Clinical Significance of Hemoglobin C.** *Bull. Johns Hopkins Hosp.* 1953, Aug., v. 93, No. 2, 94–106, 4 figs. [21 refs.]

"A simple and inexpensive apparatus has been devised for the electrophoresis of hemoglobin solutions on filter paper. By the use of this device it is possible to recognize and separate hemoglobins A, S, C and F. The technique is well suited for application to mass surveys to determine the

incidence of various abnormal hemoglobins. Such a survey has been conducted in the out-patient clinics of the Johns Hopkins Hospital. In a study of the hemoglobins of 500 white persons, no instance of S, C or D hemoglobin was discovered. However, in 500 negroes surveyed, hemoglobin S was found to occur in 8·4 per cent and hemoglobin C in 2 per cent. The combination of hemoglobin S and hemoglobin C in the same patient gives rise to a disease entity which on clinical grounds is readily differentiated from sickle cell anemia. Case histories of seven such patients are presented."

Neel, J. V., Kaplan, E. & Zuelzer, W. W. **Further Studies on Hemoglobin C. I. A Description of Three Additional Families segregating for Hemoglobin C and Sickle Cell Hemoglobin.** *Blood.* 1953, Aug., v. 8, No. 8, 724–34, 3 figs.

"Three families are described in which there occur one or more children with sickle cell-hemoglobin C disease. Additional data are presented concerning two previously described families."

Kaplan, E., Zuelzer, W. W. & Neel, J. V. **Further Studies on Hemoglobin C. II. The Hematologic Effects of Hemoglobin C alone and in combination with Sickle Cell Hemoglobin.** *Blood.* 1953, Aug., v. 8, No. 8, 735–46, 8 figs.

"It is now clear that there are several distinct hematologic disorders associated with the presence of the sickling gene and that it is essential, for prognostic purposes, to distinguish between the various forms. One of these syndromes, sickle cell-hemoglobin C disease, is due to the simultaneous presence in one individual of the genes responsible for sickle cell hemoglobin and hemoglobin C. Our studies have shown that this entity has its own characteristic diagnostic profile and can be differentiated from classical sickle cell anemia by simple hematologic methods.

"Individuals heterozygous only for the hemoglobin C gene appear to be completely asymptomatic. An increase in target cells is the only consistent hematologic abnormality of the hemoglobin C trait, which is clearly differentiated from the sickle cell trait by the absence of sickling, and from thalassemia minor by the absence of microcytosis, hypochromasia, and abnormalities in erythrocyte contour.

"The homozygous state with respect to hemoglobin C has not yet been recognized. Careful search should be made for this and the expected combinations of hemoglobin C with thalassemia, spherocytosis, and other inherited erythrocyte disorders."

EPIDEMIC DROPSY

Chaudhuri, R. N. & Chakravarty, N. K. **Vascular Pattern in Argemone-Fed Animals.** *Indian J. Med. Sci.* 1953, July, v. 7, No. 7, 334–7, 4 figs.

"In view of the lethal effect and fatty infiltration of liver with 1% argemone oil and the vascular changes, it appears that a concentration of one per cent or more is toxic to the tissues, while 0·5% may also be toxic

after prolonged ingestion. It should be mentioned, however, that different batches of argemone oil may vary in their toxic effects on the animal tissues."

DERMATOLOGY AND FUNGUS DISEASES

Furtado, T. A. Comprometimento pulmonar na blastomicose Sul-americana. [**Pulmonary Involvement in South American Blastomycosis**] *Rev. Assoc. Med. Minas Gerais.* 1952, Mar.-June, v. 3, Nos. 1/2, 49–57, 6 figs. [21 refs.] English summary.

Pulmonary lesions were, at one time, considered to be infrequent in South American blastomycosis (Lutz's disease), but recent reports, based on significantly large groups of patients, have shown that the rate of pulmonary involvement may be as high as 84 or 94 per cent.

The present report deals with an analysis of 20 cases of Lutz's disease observed in the State of Minas Gerais in the 7-year period 1944–1950. The principal data may be set out as follows: *Age*: the ages of the patients ranged from 13 to 62 years but 17 of the 20 were over the age of 30. *Sex*: males numbered 16 and females 4. *Race*: the White race predominated with 13, Negroes numbered 4 and half-breeds 3. *Occupation*: there were 14 agricultural workers, 3 domestic workers, 1 blacksmith, 1 trader and 1 vagrant. The sites of the lesions were glandular in 18 cases, mucosal in 15, pulmonary in 18 (90 per cent.), cutaneous in 4 and affecting other organs in 3. The duration of the disease, in 8 of the cases, was from 5 months to 3 years. The initial diagnosis of Lutz's disease was based on histopathology in all cases.

The radiological picture of the lungs often showed very extensive lesions but it was not characteristic and it resembled that seen in other pulmonary mycoses and in tuberculosis. The general and special symptoms were often remarkably mild in contrast with the extent of the pulmonary lesions, and the search for *Paracoccidioides brasiliensis* in the sputum was usually an unsatisfactory procedure for diagnosis in the pulmonary disease.

Pulmonary lesions may appear at any stage of Lutz's disease and in connexion with any of its clinical forms, but the frequency of pulmonary involvement—90 per cent. in the present series of cases—may indicate primary infection of the lungs, which would have a significant bearing on the epidemiology of the disease, at present imperfectly understood.

The response of the disease to sulphonamide therapy is so good that it may be accepted as confirming the diagnosis. *J. T. Duncan*

TROPICAL OPHTHALMOLOGY

Del Río Cabañas, J. L. Capítulos de oftalmología tropical. [**Tropical Ophthalmology**] *Med. Colonial.* Madrid. 1953, Jan. 1 & Aug. 1, v. 21, No. 1, & v. 22, No. 2, 10–19; 173–84, 10 figs. (2 coloured on pl.).

The full title of this is "Chapters of Tropical Ophthalmology" and it would appear to be the first of a series, for the first part is designated Chapter I and the second part "continuation of chapter I" and it deals

with the effects of the sun's rays, the air (climate) and dust on the eyes of those living in the tropics. The character, nature and physiology of the component parts of the eye are discussed—the aqueous and vitreous humors, the lens and the retina—and the effects of the sun's rays in causing keratoconjunctivitis, retinitis and various forms of scotoma, with the prognosis and treatment. The second part is devoted to pterygium and its surgical treatment. A table gives a list of 8 types of operation and some 40 techniques for performing these. The types include ligature, cauterization, scraping, electrolysis and thermocoagulation, simple excision, deviation and several plastic operations. It goes into a good deal of detail which will be of interest to specialists engaged in ophthalmology but is rather deep for the general practitioner in the tropics. *H. Harold Scott*

Falcone, G. Etiologia e terapia delle iridocicliti ai tropici (note ed osservazioni per la Somalia). [**Observations in Somalia on the Aetiology and Treatment of Iridocyclitis in the Tropics**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1953, June, v. 34, No. 6, 300–310, 1 fig.

The English summary appended to the paper is as follows:—

"The inflammation of the anterior uvea is of particular importance, from the medical point of view, because it is, nearly always, secondary to general diseases.

"In Somalia, amongst 592 cases of iridocyclites, occurred during four years, the most frequent causes are represented by the tick-borne relapsing fever and syphilis: other diseases, principally rheumatism, tuberculosis, general sepsis and, very probably, focal infection are reported.

"Besides the general therapeutics, specific for each general disease, there is indicated the topical use of atropine, dionin and cortisone."

See also p. 1142, Landau, Bachrach and Gurevitch, **The Bacterial Flora of the Conjunctiva of Leprous Patients.**

HEAT STROKE AND ALLIED CONDITIONS

Medical Research Council: Climatic Efficiency Sub-Committee of the Royal Naval Personnel Research Committee. **Physiological Responses to Hot Environments of Young European Men in the Tropics. I. A Preliminary Study to determine the Effects of Exposure for Four Hours Twice Weekly to Varying Combinations of Air Temperature, Humidity and Air Movement** [Adam, J. M., Ellis, F. P., Irwin, J. O., Thomson, M. L. & Weiner, J. S.]. 1952, Oct., 98 mimeographed folio pp., 10 figs. [R.N.P. 52/721, C.E.S. 368, T.R.U. 1.]

The object of this study was to find whether naval ratings, naturally acclimatized to heat by residence in Singapore, showed the same quantitative reactions to various thermal conditions as similar volunteers who had been intensively acclimatized by repeated daily exposures to high temperatures in London, but who had otherwise lived in the English climate. The London investigation has been reported as yet only in restricted form (McArdle, Dunham, Holling, Ladell, Scott, Thomson and Weiner. Reports R.N.P. 47/391, 1947, and 45/316, 1946, to R.N. Personnel Research

Committee). The main conclusions have been included as an appendix in the present report.

To a great extent the loss of weight (mainly sweat), rectal temperature and pulse rate of Singapore men agreed with those found in London at the same environmental temperatures. For example, the overall correlation coefficient between 4-hour sweat losses in London and Singapore trials was r = 0·96. This exceptionally high correlation nevertheless concealed differences of theoretical and practical moment between the 2 series.

One such difference concerns the effect on body thermoregulation of wearing overalls and shorts. At all air movements the London trials indicated that shorts were preferable to overalls, but the Singapore trials showed that this was only true at low air movements and dry bulb temperatures less than 100°F. At about 100 ft./min. air velocity, at dry bulb temperatures higher than 100°F., the graphs of sweat loss against air movements crossed each other with the result that at higher air movements more sweat was produced by men in shorts than in overalls. It was concluded that, as might have been expected on physical grounds, the adverse effects of convective heat gain outweighed the favourable increased evaporative heat loss resulting from the greater air velocity.

Readers of this *Bulletin* will perhaps be more interested in the heat stress scale of McArdle *et al.* ("predicted 4-hour sweating rate" or P4SR), summarized here in sufficient detail to allow estimation of the relative severity of any hot environment. It would seem that the only excuse for adding a new scale to those already in existence is that it should be comprehensive. The P4SR scale fulfils this requirement by making allowance for the following 6 factors affecting heat stress; wet bulb, dry bulb and globe (radiant heat) temperatures, air velocity, rate of energy expenditure and insulating power of clothing. It also assesses the effects of air movement more accurately than the effective temperature scale which underestimates the beneficial effect of increasing air movement from say 0 to 100 ft./min. and neglects the adverse effects of air above 100°F. moving at velocities greater than 300 ft./min.

In its present form the P4SR scale is somewhat involved and physical equations for the graphs have not yet been set forth. These defects may be eliminated before publication in full but, even in its present form, the scale should be widely used in the high temperature range for which it was designed. *M. L. Thomson*

Selle, W. A., **Body Temperature: its Changes with Environment, Disease and Therapy.**

This book is reviewed on p. 1184.

MISCELLANEOUS DISEASES

Laufer, W. E. **Onyalai.** *South African Med. J.* 1953, Aug. 8, v. 27, No. 32, 657–9.

Dr. Laufer records his experience from Bechuanaland on onyalai, describing the clinical picture as well as its treatment.

The aetiology remains obscure, but he believes the disease to be allergic. Hence the success he claims by treating onyalai with antihistamines.

The characteristic lesions are the haemorrhagic bullae situated in the

mouth and mucous surfaces. They vary greatly in size and number. Subconjunctival and skin haemorrhages are also commonly seen. The blood shows mostly a post-haemorrhagic anaemia, and the white cells are little altered but leucocytosis is usually present. Although a thrombocytopenia has been described by most other workers, the author finds the platelet count not uncommonly unaltered.

The bleeding time, however, was invariably prolonged in his cases. The predominating complaint is bleeding, mostly from the mouth and nose, and other sites such as the vagina in the female. A haematuria, bloody diarrhoea, and even an haemoptysis are fairly often encountered.

The patient may be of any age and of either sex, though most cases occur before middle age. The author finds no seasonal variation. In his experiences about 30 per cent. of the patients die, but he states there is no real guide to prognosis.

The author is responsible for one of the latest treatments introduced for onyalai. He claims that in a series of 20 patients, all recovered *rapidly* with antihistamine. His routine treatment is:—

Adrenaline 1: 1000 given hypodermically twice a day, the maximum adult dose being 10 minims. This is continued for about 2 or 3 days, but may be administered for longer. In addition, Anthisan 0·1 gm. tablets is given three times a day, and one tablet Phenergan 0·025 gm. tablets may also be taken three times a day. The antihistamine drugs are continued for 5 to 7 days, the dosage varying according to age. Details of 19 cases are shown in a table. *M. E. Gelfand*

Joannides, C. C. **Favism in Cyprus. Analysis of 67 Cases admitted to Nicosia General Hospital during the Last 3 Years.** *Cyprus Med. J.* 1952, Jan., v. 5, No. 3, 795–9.

This analysis of cases emphasizes two main facts, namely, that males appear to be more susceptible to favism than females (if the sexes are equally exposed), 64 of the 67 were boys, and that a large majority (56) were between 1½ and 5 years old. Five only were above this age, the oldest being 9 years; 2 were breast-fed infants of 5 and 9 months whose mothers are said to have eaten broad beans but they denied giving any to their infants. Thirty-eight of the 67 occurred in April and May; no other month gave more than 6. All patients were Greek or Turkish Cypriots; there were no cases in Armenian or English children.

The symptoms are those of an acute haemolytic anaemia, ending fatally in 3–4 days in many cases, if untreated. The patient, a few hours after eating the beans becomes quiet, with increasing pallor, abdominal pain, diarrhoea and slight vomiting; restlessness and some jaundice, passage of dark, perhaps bloody, urine follow and death after a few hours of drowsiness, dyspnoea and final coma. The blood shows a rapid fall in red cells to 1½ million per cmm. or even less, with Hb 25 per cent., and leucocytes to 30,000; normoblasts about 20 per 100 leucocytes.

The author divides his cases into 4 types or grades: 1. Mild, recovering spontaneously; 2. Severe, the majority, dying unless given transfusion early; 3. Fulminating, fatal in a few hours [these are mentioned on theoretical or hearsay grounds, for none of the 67 was of this type]; 4. With haemolysis persisting in spite of treatment; result uncertain, some die, some recover.

Treatment consists in transfusion of whole blood, 100–300 cc. according to the age of the patient. Warning is given against transfusing too much. Four possible theories of aetiology are mentioned: 1. fungus infection of

the beans; 2. haemolytic poison in some of the beans; 3. allergy, because instances do not occur after the first meal of the beans; 4. some susceptible factor in the blood of male children, possibly congenital and racial. [These are only theories; no experimental work seems to have been undertaken to test them.] *H. Harold Scott*

Mauzé, J. & Arnaud, G. A propos des accidents provoqués par le mancenilier des Antilles. [**Accidents due to** *Hippomane mancinella* **in the Antilles**] *Bull. Soc. Path. Exot.* 1953, v. 46, No. 4, 496–8.

The fruit of *Hippomane mancinella*, the Manchineel tree, is known to contain a vesicant poison and for many years sailors landing in the Antilles have fallen victims from eating the fruit, deluded by its resemblance to apples. This is now generally known and when the training cruiser *Jeanne d'Arc* arrives each year at Iles des Saintes, the mayor or some official acting for him comes on board and fixes up a branch as a warning to the young cadets of the dangers of the fruit, the tree growing freely at the edge of the shore. That parts, other than the fruit, are also vesicant is not so generally known and the authors mention the case of a boy sheltering beneath a Manchineel tree from a heavy shower of rain for a few minutes and becoming blistered on back and chest. They give more details of a man who broke a small twig of the tree, only 2 mm. in diameter, between his thumb and forefinger; no obvious moisture exuded, but half an hour later he retired to a cocoa tree to micturate and 30–40 minutes after felt a burning sensation of penis and scrotum. On reaching his destination he said that he " was suffering horribly ". The scrotum and skin of the penis were very red and inflamed. Strong solution of bicarbonate of sodium was applied without benefit; ointments and other remedies did little good, beyond enabling him to get a little rest during the night. The following morning the scrotum was covered by large confluent blisters; dressings of castor oil were applied and the blisters gave place to a bleeding surface, " the lesions of a second-degree burn ". An ointment of aureomycin and ectogan [not defined] brought about healing in a week.

Old residents of Guadeloupe say that the best treatment is the local application of sea-water as soon after exposure to the poison as possible or, if the fruit is eaten, large draughts of sea-water. The legend runs that the tree was planted by the Caribs round all the islands in order that their enemies might, on landing, eat of the fruit, be poisoned and die.

H. Harold Scott

PROTOZOOLOGY: GENERAL

Vivell, O. & Buhn, W. H. Zum Problem der Toxoplasmose in der Gravidität. Ergebnisse serologischer Untersuchungen bei fertilen Frauen sowie Stellungnahme zur Aureomycinprophylaxe der latenten Toxoplasmose. [**The Problem of Toxoplasmosis in Pregnancy. Results of Serological Examinations of Fertile Women. Aureomycin Prophylaxis in Latent Toxoplasmosis**] *Ärztl. Forschung.* 1953, July 10, v. 7, No. 7, I/326–35. [45 refs.]

This paper describes an investigation by means of the Sabin-Feldman test, as modified by Meyer and Roth, of the problem of toxoplasmosis in

pregnancy. A total of 528 clinically healthy persons was examined. These consisted of the following groups:—(1) 118 women with healthy infants, (2) 70 women who had had still-births or deformed infants, (3) 84 women with abortions, (4) 54 pregnant women, (5) 132 healthy but not pregnant women and (6) 70 healthy men. The test was undertaken at titres of 1:2, 1:12, 1:25 and 1:100 and over. On the assumption that a positive result in the test at low dilution is evidence of infection it was found that the 6 groups gave positive results in 62·7, 61·4, 66·7, 63·0, 56·1 and 55·7 per cent. respectively. At higher titres these differences between groups became greater. The analysis is set out in some detail. For example, it was found that in 27 women in the puerperium who had given birth to deformed infants the test was positive in 16 (59·2 per cent.) at a titre of 1:25 and over and in 4 (14·8 per cent.) at a titre of 1:100 and over, whereas in 21 women with still-births the corresponding number of positives at these dilutions was 7 (33·3 per cent.) and 1 (4·7 per cent.). Positive results at high titre were found in 10 to 15 per cent. of women who gave birth to normal children but in 26 per cent. of pregnancies resulting in still-births and deformed infants. In some of these women, particularly in those with a suspicious history, prophylaxis during pregnancy with aureomycin or sulphonamides may be indicated. On the balance of evidence it is considered that the latter treatment is the more promising.

The whole subject is fully discussed. *M. E. Delafield*

Weigand, W. & Gleim, F. Sabin-Feldman-Test und Komplementbindungsreaktion nach Westphal zur serologischen Diagnose der Toxoplasmose. [**The Sabin-Feldman Test and Westphal's Complement-Fixation Reaction for the Serological Diagnosis of Toxoplasmosis**] *Klin. Woch.* 1953, Mar. 15, v. 31, Nos. 11/12, 268–70. [15 refs.]

The authors carried out a serological study with 345 samples of sera from patients suspected to be suffering from toxoplasmosis. The object of this investigation was to verify the efficacy of Westphal's modification of the complement-fixation test, which was compared in parallel trials with the dye test. The results are compared with those obtained by Westphal and Bauer [this *Bulletin*, 1952, v. 49, 905]. In the present work the titres of the serum in the dye test were assessed as follows: 1:12 negative, 1:36 doubtful, 1:72 and higher—positive, whereas Westphal adopted titres of 1:4, 1:25 and upwards of 1:50 for the corresponding values.

The results of the tests (per cent.), as compared with those of Westphal and Bauer (in brackets), were as follows: complete correspondence between the two methods in 76 (85), doubtful coincidence in 14 (9), contradiction in 10 (6).

In a discussion of the peculiarities of the serological tests for toxoplasmosis, it is pointed out that their specificity can be demonstrated in experimentally infected animals and in accidentally infected human beings, since in both cases originally negative reactions are succeeded by positive ones. As regards their mechanism, there is reason to believe that the two reactions are due to different antibodies. The dye test, which becomes positive earlier than the complement-fixation test and usually remains positive for the rest of the host's life, can serve as an indicator of a latent toxoplasmic infection. On the other hand, the complement-fixation reaction, which appears later and then becomes negative again, is more characteristic of acute forms of toxoplasmosis. *C. A. Hoare*

ENTOMOLOGY AND INSECTICIDES: GENERAL

[Papers on the toxic effects of insecticides in man are abstracted in the *Bulletin of Hygiene* under the general heading of Occupational Hygiene and Toxicology.]

Mackerras, I. M. & Mackerras, M. J. **Problems of Parasitology and Entomology in Australia.** A Report prepared for the Pan Indian Ocean Science Congress, 1954. *Australian J. of Sci.* 1953, June 22, v. 15. No. 6, 185–9

Kitchen, W. H. & Gall, D. **A Controlled Humidifier for Insect Breeding Rooms.** *Bull. Entom. Res.* 1953, July, v. 44, Pt. 2, 367–9, 1 fig.

Details are given of a humidifier, working on the principle of a fine water-mist induced by compressed-air action, which has effectively maintained a relative humidity of about 80 per cent. at a mean temperature of 77°F. in a room 40 ft. long by 20 ft. wide used for breeding a laboratory strain of tsetse-fly in Nigeria. *D. S. Bertram*

Judge, P. J. **A New Method for determining the Transition Temperature of Insect Cuticular Waxes.** [Correspondence.] *Nature.* 1953, Aug. 29, v. 172, 405–6.

Ramsay, J. A. **Active Transport of Potassium by the Malpighian Tubules of Insects.** *J. Exper. Biol.* 1953, Sept., v. 30, No. 3, 358–69, 1 fig. [18 refs.]

Kasman, S., Roadhouse, L. A. O. & Wright, G. F. **Studies in Testing Insect Repellents.** *Mosquito News.* 1953, June, v. 13, No. 2, 116–23, 6 figs.

Although tests on man are the final criterion of a new repellent, there are several reasons why it is more convenient to employ animals for initial sorting tests. The authors have developed a method, using guineapigs, which gives satisfactory results. Before an animal is exposed, the hair is carefully removed from the back with an electric razor. It is then slipped into a tapered plastic cylinder ("Visking H.S. Sausage casing") in which a hole is cut to expose an even surface of skin. The animal is shaken firmly into this slippery enclosure, which is then rested on an inclined trough; it soons learns the futility of trying to escape and rests quietly. The lower end of the cylinder is folded over and sealed, except for a small hole for urine and faeces. At the head end, the animal is protected from the mosquitoes by a piece of nylon stocking fabric.

The hole in the cylinder is cut in semi-circular form to expose 35 sq. cm. of skin. This area is treated with 0·05 ml. of repellent applied from a fine hypodermic syringe and smeared evenly over the skin with a finger-tip. The prepared guineapig is then exposed to about 1,000 *Aëdes aegypti* in a large cage for 3 minutes. It is removed for 27 minutes and then put back for a further 3 minutes; and so on. Observations are made of the numbers of mosquitoes landing and finally of actual bites and ingestion of blood. The duration of protection time (T) is not measured by a single bite (which might be anomalous) but by the following formula:

$$T = (30)n + 30/(b + 1)$$

when n is the number of 3-minute exposures before a single exposure with 3 bites or before successive exposures with at least 3 bites, and b is the number of bites that occur in the first exposure that contributes to a total

of 3 bites within that or succeeding exposures. [It is not clear how this formula is derived; nor, in view of the second term, why " if three bites occur in the first exposure, T equals zero ".]

The authors give results of tests with 44 compounds and compare the protection times observed for guineapigs with those for human arm tests. The correlation (illustrated graphically) is good, protection time of the human arm being usually about 20 minutes longer than that with the guineapig.

In an investigation of the reasons for failure of repellents after a time, the authors measured the evaporation rate of dimethyl phthalate at skin temperature. The evaporation of filter paper was slow and indicated a duration at least 20 times that found in tests on the guineapig. It was therefore supposed that some repellent had been absorbed through the animal's skin. A recovery of benzoic acid from the urine (not present in controls) seemed to indicate that skin absorption is a significant factor in failure of repellents.

The authors also examined a hypothesis that olfactory compounds selectively absorb in the infra-red spectral region. They found no correlation of infra-red absorption bands with repellent properties of 16 of their more promising compounds. *J. R. Busvine*

See also p. 1116, Sommerman and Foote, **Pictorial Keys to the Mosquitoes of Medical Importance.**

Vermeil, C. Contribution à l'étude des *Culicides* du Fezzan (Lybie). Présence d'*Anopheles broussesi* E. à El Barka (Territoire de Rhat). [**Study of Mosquitoes from the Fezzan (Libya). Evidence of** *Anopheles broussesi* **in El Barka**] *Bull. Soc. Path. Exot.* 1953, v. 46, No. 3, 445–54, 1 map & 1 fig. on 2 pls. [16 refs.]

Mosquitoes already recorded from the Fezzan (Libya) are *Anopheles sergenti*, *A. superpictus*, *A. multicolor*, *Aëdes mariae*, *Culex pipiens* and *C. fatigans*. The author of this paper collected mosquito larvae from disused wells and is able to add to the above, *Anopheles broussesi*, *Aëdes caspius*, *Culex pusillus*, *C. univittatus* and *Theobaldia longiareolata*. He did not obtain *A. superpictus* probably because of unsuitability of habitat and he remarks that *Aëdes mariae* and *Culex fatigans* are likely to be rare or absent.

As a matter of interest he also reports the absence among his collection of larvae from the Fezzan of *Anopheles dthali*, *A. hispaniola* and *Aëdes aegypti*. *H. S. Leeson*

Ludvik, G. F. **Topical Application of Insecticide Solutions to** *Anopheles quadrimaculatus*. *J. Econom. Entom.* 1953, Apr., v. 46, No. 2, 364–5.

The method of topical application for testing insecticides has the advantages of giving similar, known, doses to each individual insect. Hitherto, it has not been used with mosquitoes because of the difficulty of handling and treating such delicate insects. In the method here described, the insects (*Anopheles quadrimaculatus* and *Aëdes canadensis*) were stupefied by carbon dioxide in a glass chamber (8 × 6 inches) after 30 seconds exposure to a current of 0·3 to 0·5 cu. ft. per minute. The mosquitoes were handled by means of forceps which picked them up by the wings.

About 15 could be treated during the period of stupefaction. A micrometer syringe was used to apply 0·5 or 0·25 c.mm. of alcohol solution of insecticides to the dorsum. [The details of the apparatus are difficult to follow because the Figure 1 referred to, is not printed.] Log concentration-probit regression lines were fitted to the results and gave the following comparative results with *A. quadrimaculatus*.

Insecticide	LD50 (microgrammes) *Male*	*Female*
p,p' DDT	·020	·066
p,p' TDE	·041	·10
Methoxychlor (tech.) ...	·035	·10
Chlordane	·105	·24
Dieldrin	·009	·023
Lindane	·0085	·011
Toxaphene	·15	·29
Malathon	·0087	·0095
Allethrin	·0029	·008

It is apparent that dieldrin, lindane, malathon and allethrin are considerably more toxic to *A. quadrimaculatus* than is DDT. This is also true when the LD 90 figures are inspected, but the differences are not so great.

J. R. Busvine

Brennan, J. M. & Harwood, R. F. **A Preliminary Report on the Laboratory Colonization of the Mosquito,** *Culex tarsalis* **Coquillett.** *Mosquito News.* 1953, June, v. 13, No. 2, 153–7, 1 fig.

Culex tarsalis appears to be a particularly important mosquito in the epidemiology of the encephalitides of North America. Attempts to establish laboratory strains of this mosquito have been unsuccessful, but this paper now reports that a flourishing strain has been maintained for 10 generations in the Rocky Mountain Laboratory in Montana. The method is described. The adults are kept in a cage 7 ft. high, 6 ft. long and 4 ft. wide. Artificial lighting is controlled to give about 16 hours of full light, 6 hours of darkness and a twilight and dawn period (each of an hour's duration) in which the light intensity is slowly changed. For the first 6 generations these lighting conditions were maintained regularly and accompanied by appropriate adjustments of temperatures and humidities to emulate such variables as in nature. But, latterly, the dawn period was omitted and the atmospheric conditions remained continuous for 24 hours at about 70°F. and 70 per cent. relative humidity without apparent ill effect on the colony. Nor did week-end periods of full light appear to have an adverse effect. The twilight period appears to be important. Male swarms then occur with frequent intrusions by females when mating on the wing takes place. Blood meals were provided 2 or 3 times a week by suspending a young fowl in a cage from the ceiling of the mosquito cage; 10 per cent sugar solution in pads was always available. Egg-rafts of 230 eggs have been obtained and as many as nearly 5,000 eggs in a day, of which 83 per cent. hatched. The larval and pupal period is completed in about 13 days. The medium used for larval rearing is given in detail. The complete cycle takes about 25 days. Males have been known to live for 2½ months and females for over 4 months.

Fairly good results were also obtained in smaller cages (16 in. × 16 in. × 24 in.) but when these were housed in a room with windows and natural light the results were erratic.

D. S. Bertram

Hayes, R. O. **Studies on the Artificial Insemination of the Mosquito *Aedes aegypti* (Linnaeus).** *Mosquito News.* 1953, June, v. 13, No. 2, 145–52, 3 figs. [10 refs.]

This work was undertaken with the hope that it might lead to methods of artificial insemination which would provide a means of keeping laboratory strains of mosquito species which do not mate under laboratory conditions.

The technique of breeding the *Aëdes aegypti* is briefly described and an illustrated account of the male and female genital systems is given, followed by a short discussion of the morphology of the spermatozoa and the conditions for their survival when removed from the male. Artificial insemination consisted of depositing sperms in the bursal pouch of the female by fine techniques, the difficulties of which are fairly fully set out.

Of 105 females inseminated, 57 survived to take one or more blood meals and, although all but two of them lived long enough to be gravid, only 22 laid eggs. The largest numbers of eggs laid in one oviposition was 75 and one individual laid 85 in two ovipositions. None of the eggs produced larvae; nor were sperms found in the spermathecae of any of the females. Control experiments showed that the actual operation of artificial insemination had no deleterious effect on the ability of a female to produce fertile eggs and it is concluded that the negative results from the experimental females were due to a failure to obtain fertilization by the method used. Further work is in progress. *D. S. Bertram*

Omori, N. & Fujii, S. **On the Feeding Habits of *Aedes togoi* and some other Species of Mosquitoes.** *Yokohama Med. Bull.* 1953, Feb., v. 4, No. 1, 23–31.

Mosquitoes were collected in a human bait trap once a month from May to October, 1951, on the islet of Oshima (36°12′N., 136°08′E.) off the coast of Fukui Prefecture, Japan.

Collections were made hourly, starting between 3 and 8 p.m. on one day and finishing between 7 a.m. and 12 noon the next day. Altogether 2,681 mosquitoes were caught, of which 2,360 (88 per cent.) were *Aëdes togoi*; all but 3 of them were females. This species was breeding abundantly in the many tidal pools; the 7 other species which were present were thought to have come from the mainland.

A table giving the hourly catches of females shows that *Aëdes togoi* came to bite man at any time but especially between 1 and 3 hours after sunset and again just after sunrise. Other observations suggest that the larvae tolerate a wide range of salinity.

In discussing the results of their experiments and observations the authors conclude that, although *Aëdes togoi* usually prefers to feed on cattle rather than on man, man will be attacked by females of this species if he is near the breeding places, especially in isolated places like Oshima where they are abundant. *H. S. Leeson*

Brown, A. W. A. & Watson, D. L. **Studies on Fine Spray and Aerosol Machines for Control of Adult Mosquitoes.** *Mosquito News.* 1953, June, v. 13, No. 2, 81–95, 6 figs. [14 refs.]

During 1951 and 1952 a comparative study was made of 5 aerosol machines for their ability to control infestations of adult *Aëdes* mosquitoes about camps in the Canadian woodland. The machines were used to disperse clouds of DDT aerosol and were moved at 1 to 3 m.p.h. along a

road, the discharge rates being equivalent to about 0·7 gal. containing 0·35 lb. DDT for every 100 yd. of frontage. (If this were repeated at intervals of 350 yd., the dosage per acre would be approximately 0·05 lb. DDT.) Physical, chemical and biological tests of the aerosols were made at various distances down wind from the path of the machines. Tests were made in dense woodland and relatively open country. Determination of droplet spectra was made at various points with cascade impactors and also by drawing coated slides rapidly through the aerosol cloud. The ground deposits at different distances were assessed by estimations of DDT on exposed slides, while the quantities still air-borne were judged from the amounts deposited on 25-mesh copper screening fixed vertically. The effects on the mosquitoes were assessed by landing rates on observers walking in the treated zones before, and one hour after application. The machines examined were the following:

(1) *The Microsol Mechanical Aerosol Generator.* The insecticide is mechanically atomized by being thrown off the periphery of a sheaf of twenty-one 8½ inch discs rotating at about 9,000 r.p.m. Petrol consumption is 0·6 gall. per hour. Weight, empty, is 442 lb.

(2) *The Husman Pneumatic Fine-Atomizing Sprayer.* The insecticide is atomized by 6 nozzles supplied with air at 8–15 p.s.i. by a 1¼ h.p. motor. Petrol consumption: 0·24 g.p.h. Weight, empty: 125 lb.

(3) *The Bes-Kil Aerosol Generator* (a modification of the Hochberg-LaMer machine). The insecticide is pumped to a nozzle, where it is atomized by steam at 500 to 700°F. Heat and power are supplied by a 1½ h.p. petrol engine. Water is consumed at the rate of 40 or 80 gall. per hour. Petrol consumption: 0·65 g.p.h. Weight, empty: 920 lb.

(4) *The Dyna-Fog Jet Insecticidal Fog Generator.* Insecticide is injected into the exhaust of a pulse-jet engine, producing 60 explosions per second. Petrol consumption: 2·5 g.p.h. Weight, empty: 95 lb.

(5) *The TIFA* (*Todd Insecticidal Fog Applicator*). The insecticide is injected into a fog head through which hot air (1000°F.) is blown at 150 cu. ft. per minute. Petrol consumption: 13 g.p.h. Weight, empty: 600 lb.

The results, which are given in some detail, may be summarized roughly as follows:

	Droplet spectra		Fallen to ground, 100 yd. (%)	Approx. mgm. DDT recovered on screens 300–400 yd.		% Reduction mosquito landing rate 100–400 yd.
	m.m.d.	curve		clear	woody	
Microsol	90	normal	97	nil	nil	37
Husman	38	slight skew	9	45	nil	26, 80
Bes-Kil	25	wide and irregular	4	140	1	27, 39
Dyna-Fog	10	skew: mode low	<·02	50	18	87, 88
TIFA	17	symmetrical	<·004	75	50	74, 88

Most of these comparative tests were made with 5 per cent. DDT solution in fuel oil, but a few experiments with 30 per cent. DDT in methylated aromatic oil did not give appreciably different results when used at the same rate of DDT per 100 yd. frontage.

The authors discuss the performance of the various machines in the present series of tests and in other areas and reach the following conclusions. The Microsol machine is not a strictly aerosol apparatus and is not suitable for this type of work as its effect does not extend beyond 200 yd. down wind. The Husman sprayer was effective for distances up to 400 yd. in open woodland, but not in dense woods. The Bes-Kil generator also gave poor results in dense woods, despite its high emission rate of aerosol droplets. The TIFA and Dyna-Fog were both effective in reducing landing rates of mosquitoes for distances up to 400 yd. through dense woods.

J. R. Busvine

Vargas, L. & Martínez Palacios, A. Nota sobre la distribución de *Haemagogus* en México. (Insecta: Diptera). [**Note on the Distribution of *Haemagogus* in Mexico**] *Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1953, Mar., v. 13, No. 1, 37–9. English summary (3 lines).

Haemagogus equinus is known from Mexico and *H. anastationis* and *H. mesodentatus* are now recorded for the first time. Some females, resembling *H. equinus* but with some differences, are noted but not accorded a specific identity.

D. S. Bertram

Sternburg, J., Vinson, E. B. & Kearns, C. W. **Enzymatic Dehydrochlorination of DDT by Resistant Flies.** *J. Econom. Entom.* 1953, June, v. 46, No. 3, 513–15.

It has been known since 1950 that DDT-resistant houseflies are able to dehydrochlorinate DDT to DDE at a faster rate than a susceptible strain, and Sternburg and Kearns [this *Bulletin*, 1952, v. 49, 562] concluded that this ability in a resistant strain S could account for its DDT resistance. Chadwick [this *Bulletin*, 1952, v. 49, 1159] questioned the significance of the dehydrochlorination of DDT as a cause of resistance and suggested that it may be the result of flies being able to survive DDT. This is answered by the authors having demonstrated the presence of an enzyme system in the S resistant strain which is capable of rapidly converting DDT to DDE, while the enzyme system is absent in a susceptible strain. Details of how the enzyme was isolated as a crude extract are given.

The crude enzyme extract from the DDT-resistant flies will dehydrochlorinate DDT in the presence of air, in an atmosphere of nitrogen and in the presence of HCN provided that adequate quantities of glutathione are added to the reaction mixture before incubation with DDT. The enzyme system will dehydrochlorinate DDT in increasing amounts as the quantity of DDT is increased. The crude extract from a single resistant fly may dehydrochlorinate 5–7 μgm. of DDT in 1 hour under the most favourable conditions with pH 7·4. The enzyme is inactivated when heated to 60°C.

However, under conditions where the largest amounts of DDE are found, correspondingly larger amounts of the original quantity of DDT applied cannot be accounted for. It was shown that DDE is not a metabolic intermediate by the recovery of DDE in the original amount when exposed to the enzyme. Thus it appears that the enzymatic detoxification of DDT could be accomplished by means other than dehydrochlorination. However, this other detoxifying mechanism is restricted to the DDT-resistant strain as in the case of the dehydrochlorination mechanism.

Thomas E. Fletcher

Tahori, A. S. & Hoskins, W. M. **The Absorption, Distribution and Metabolism of DDT in DDT-Resistant Houseflies.** *J. Econom. Entom.* 1953, Apr., v. 46, No. 2, 302–6.

Bequaert, J. C. **The Hippoboscidae or Louse-Flies (Diptera) of Mammals and Birds. Part I. Structure, Physiology and Natural History.**

This book is reviewed on p. 1182.

Rivosecchi, L. I Muscidi pungenti (Diptera, Stomoxydinae) italiani. [**Contribution to the Knowledge of Italian Haematophagous Muscidae (Diptera, Stomoxydinae)**] *Rendiconti Istituto Superiore di Sanità.* Rome. 1953, v. 16, Pts. 4, 5 & 6, 286–332, 104 figs. on 7 pls. [Refs. in footnotes.] English summary (9 lines).

Hack, W. H. Segunda contribución al estudio de los tabánidos argentinos (Diptera). [**Second Study of Tabanids in Argentina**] *An. Inst. Mel. Regional.* Tucuman, Argentina. 1953, June, v. 3, No. 3, 339–47, 10 figs. (2 on pl.). [13 refs.] English summary (4 lines).

Stiles, G. W. & Cleland, W. S. **Intestinal Myiasis from Rat-Tailed Maggots in a Woman.** *Arch. Intern. Med.* 1953, June, v. 91, No. 6, 812–16, 2 figs.

Wygodzinsky. P. Sobre algunos simúlidos argentinos (Diptera). [**Some *Simulium* Types in Argentina**] *An. Inst. Med. Regional.* Tucuman, Argentina. 1953, June, v. 3, No. 3, 293–320, 127 figs. [20 refs.] English summary.

Wygodzinsky, P. Sobre algunos simúlidos de los países andinos (Diptera). [**Some Simulium Types in the Andes Region**] *An. Inst. Med. Regional.* Tucuman, Argentina. 1953, June, v. 3, No. 3, 321–37, 104 figs. English summary.

Hopkins, G. H. E. & Rothschild, Miriam. **An Illustrated Catalogue of the Rothschild Collection of Fleas (Siphonaptera) in the British Museum (Natural History) with Keys and Short Descriptions for the Identification of Families, Genera, Species and Subspecies. Vol. I. Tungidae and Pulicidae.**

This book is reviewed on p. 1183.

Shawarby, A. A. **Laboratory and Field Trials in the Control of Fleas and Lice.** *Bull. Entom. Res.* 1953, July, v. 44, Pt. 2, 377–85, 4 figs. [17 refs.]

The laboratory experiments were done in London and involved precise measurements of the toxicity of various insecticides to lice (*Pediculus humanus humanus* L.) and fleas (*Xenopsylla cheopis* Roths.). The methods involved exposure to filter papers impregnated with oil solutions of the samples [see Busvine and Nash, below] and some tests with mud blocks sprayed with aqueous suspensions of DDT and *gamma* BHC. These tests showed the following levels of potency relative to DDT. *Xenopsylla* (adults) *gamma* BHC 20; dieldrin 11; aldrin 8; chlordane 1·1; pyrethrins 0·72; allethrin 0·15; toxaphene 0·18. *Pediculus* (adults) dieldrin 40; *gamma* BHC 24; aldrin 16; chlordane 5·5; pyrethrins 4·3; allethrin 1·1; toxaphene 1·0.

Some tests with flea larvae gave an even greater ratio of effectiveness of *gamma* BHC, which was 36 times as toxic as DDT. However, the tests in which fleas were exposed to dry residues of DDT and BHC on mud blocks, gave different results. In these experiments, the relative median lethal doses for 1 hour's exposure to DDT and *gamma* BHC were only in a ratio of 3 to 1. Furthermore this change was accentuated with time. Thus, blocks sprayed with 22 mgm. pp′ DDT or 3·6 mgm. *gamma* BHC per sq. ft. both gave complete kills of fleas when fresh; but after 4 days, the DDT still killed 97 per cent. while the BHC only killed 11 per cent.

Some tests with dusts showed that 10 per cent. DDT powder or 0·5 per cent. *gamma* BHC dust completely suppressed emergence from pupae when mixed at 2 per cent. with the breeding medium.

The experiment on flea control was done in a village in the Nile delta where the mud brick houses were heavily infested with *Pulex irritans* L. The houses were divided into three blocks of 96, 76 and 136 for BHC, DDT and control respectively. Estimates of flea populations were made before and at monthly intervals after treatment by banging on the floor a board covered with a sticky paper (which trapped the disturbed fleas). The treatment consisted of spraying the floors at 40 ml. per sq. metre with 5 per cent. suspensions of DDT and BHC wettable powders. (The former contained 50 per cent. of 70 per cent. pp′DDT; the latter, 615 per cent. *gamma* BHC.) The results are shown by graphs giving proportions of houses infested and mean numbers of fleas per house. Both show a very great decline in infestation of houses treated with BHC, in the first week, which is maintained for 2 or 3 months and then gradually rises; but numbers are still well below the control after 6 months. The DDT causes a decline to about 50 per cent. of the control level and this is maintained for 3 to 6 months. The initial effect of BHC was clearly superior and its apparent persistence is presumed to be due to this near eradication (98·5 per cent. kill) of the flea population.

The experiment on louse control was conducted in the same groups of houses as the flea trial. The clothes of 573 people were dusted with BHC (0·4 per cent. *gamma*), 436 with DDT (7 per cent. pp′DDT) and 551 with talc, as a control. The levels of infestation were judged at weekly intervals by examining the garments of each person and counting the lice. Results are again expressed by proportions of people infested as well as by mean numbers of lice per person.

The results were analogous to those obtained with fleas. The BHC caused drastic reduction (97 per cent. of lousiness and 99·5 per cent. of louse numbers) and maintained this for the 6 or 7 weeks of the trial. The DDT caused a fall of 73 per cent. in lousiness, which was maintained; but the initial fall in average numbers of lice (75 per cent.) was not maintained so well and was finally equal to the control figure which itself dropped considerably during the period of the trial. *J. R. Busvine*

Enigk, K. & Grittner, I. Zur Zucht und Biologie der Zecken. [**The Breeding and Biology of Ticks**] *Ztschr. f. Parasitenk.* 1953, v. 16. No. 1, 56–83, 3 figs. [Numerous refs.]

The authors have had experience for many years in the breeding of ticks, including 6 argasid and 24 ixodid species. They combine this personal experience with a good deal of literature, much of it from the past few years, to present a practical article on the breeding of ticks under laboratory conditions. The illustrations show the methods for attaching containers of ixodid ticks to the ears of a dog, the tail of a horse and of a cow. The use

of rabbit, pigeon, and other small animals is described in the text. There is a section on the care of ixodid and argasid ticks between blood meals, which contains useful information particularly on humidity requirements of different species in different stages. Apart from these practical aspects of the subject, interesting information will be found on the pathology of tick-bites in the host, host immunity to tick infestation and pathogenic conditions in ticks themselves. Tick-borne pathogenic organisms are not within the scope of the article but there is a brief discussion of tick-bite paralysis. In general, the treatment of the subject matter emphasizes the biological differences between ixodid and argasid ticks. *D. S. Bertram*

Busvine, J. R. & Nash, Ruth. **The Potency and Persistence of some New Synthetic Insecticides.** *Bull. Entom. Res.* 1953, July, v. 44, Pt. 2, 371–6, 1 fig.

DDT, *gamma* BHC, chlordane, dieldrin, aldrin, " Pyrolan " (1-phenyl-3-methyl-pyrazolyl-(5)-dimethyl carbamate), toxaphene, allethrin, and pyrethrins were tested for potency against adults of *Pediculus humanus*, *Cimex lectularius*, *Aëdes aegypti*, *Musca domestica*, and *Xenopsylla cheopis*, 4th and 5th stage nymphs of *Rhodnius prolixus* and mainly 1st stage nymphs, but also a few adults of *Ornithodorus moubata*.

In tests for initial toxicity the insecticides were dissolved at suitable concentrations in Shell oil P.31 and the test substratum consisted of Whatman No. 1 filter papers (11 cm. diameter) uniformly wetted with 1 ml. of a 1:2 mixture of the oil solution and ether, from which the ether was allowed to evaporate over an hour or two before use. Test exposures were made at 30°C. for 1 to 24 hours (according to species) and mortality recorded after 1 day to 7 days.

Residual action was tested against only bed bugs and for as long as 6 months, with dry residues deposited from acetone solutions on filter papers kept at about 18°C. in the laboratory.

The results are expressed comparatively as median lethal concentrations (per cent.) for each insecticide and recorded by tables and in a logarithmic graph. The relative potency of the insecticides is approximately as follows: *gamma* BHC > dieldrin > aldrin = pyrethrins > chlordane = DDT = " Pyrolan " = allethrin > toxaphene. The residual action is: Dieldrin = DDT = toxaphene > " Pyrolan " = *gamma* BHC = chlordane = aldrin > allethrin and pyrethrin. The high initial toxicity and the prolonged residual activity of dieldrin mark it out as a particularly promising insecticide *D. S. Bertram*

Berck, B. **Microdetermination of DDT in River Water and Suspended Solids.** *Analytical Chemistry.* 1953, Aug., v. 25, No. 8, 1253–6, 3 figs. [13 refs.]

Jennings, E. C., Jr. & Edwards, D. G. **Determination of Methoxychlor on Insecticide-treated Paperboard by Ultraviolet Spectrophotometry.** *Analytical Chemstry.* 1953, Aug., v. 25, No. 8, 1179–82, 2 figs. [11 refs.]

Martini, Erich. **Lehrbuch der Medizinischen Entomologie.**

This book is reviewed on p. 1181.

REPORTS, SURVEYS AND MISCELLANEOUS PAPERS

J. Parasitology. 1953, Aug., v. 39, No. 4, Sect. 2 (Suppl.), 50 pp. **Program and Abstracts of the Twenty-eighth Annual Meeting of the American Society of Parasitologists,** Wisconsin University, Madison, Wisconsin, September 7, 8, 9, 1953.

This programme contains the usual list of abstracts of papers prepared for the meeting. There are 111 abstracts and the title of the Presidential Address " How Parasites Tolerate their Hosts ": this is given by the President-Elect, Dr. Elery R. Becker, in the absence in the Near East of the President, Dr. C. B. Philip.

It is noted that one author has presented five papers, 9 have presented three and 28 have presented two.

Subjects of special interest to readers of this *Bulletin* include studies of *S. mansoni* (6 abstracts), *S. japonicum* (2), schistosome dermatitis (3), flukes (2), molluscicides (2), *Hymenolepis* (7), *Trichinella* (6), *Ascaris* (2), filarial worms (2), *Enterobius* (1), *Necator* (1), intestinal parasites (5), *E. histolytica* (1), *P. berghei* (3), avian malaria parasites (4), *Toxoplasma* (2), and *Leishmania* (1 abstract). *H. J. O'D. Burke-Gaffney*

King, F. A. **The Origin of Hemp " The Assuager of Grief ".** *East African Med. J.* 1953, Aug., v. 30, No. 8, 345–7.

BOOK REVIEWS

Watson, Malcolm [Kt., M.D., C.M.]. **African Highway. The Battle for Health in Central Africa.** With an Introduction by Sir Eric MacFadyen. pp. xxix + 294, 79 pls., 17 figs. & 7 maps. 1953. London: John Murray, Albemarle Street, W. [63s.]

A new book from the pen of Sir Malcolm Watson will be welcomed by those interested in tropical hygiene, who will recall the classic works by the author written during the first years of the century. It is divided into two parts, the first entitled " Health on the Copper Belt of Northern Rhodesia ", and comprising 43 chapters covering 216 pages which deal with the development of the Copper Belt over the past 25 years, in its medical, health and social aspects. The material includes important contributions by the Chief Medical Officers of the mines and by past and present members of the staff of the copper mining groups who have created in a wilderness a major world industry within the space of a quarter of a century. These contributions are in part original essays, the remainder being material which has appeared in earlier reports, all these being introduced and linked together by the author in an episodic and anecdotal style, comparisons being made with the author's wide experience in Malaya. A certain chronological order is observed but at times the line of thought is difficult to follow.

The second part of the volume is entitled " The African Village " and consists of 49 pages of text which is divided into 10 chapters. It is not clear why such a division should have been made because there is practically no reference to the African village as it now exists; the author suggests that the advances in health and environment achieved on the mines can be projected directly into the village in its primitive state. He suggests that

the mines authorities should sponsor an experimental village near one of the mines but he does not make any concrete proposals. In this portion of the book the author discusses immunity to malaria, drawing from his experience in India, Malaya and elsewhere in support of his views, although it is not evident why this important matter should be included in this portion.

There are 5 appendices:—

1. Sluicing, drainage and shade and their application in the biological control of *Anopheles gambiae*.
2. Some malaria problems
3. African hospitals
4. Construction of African hospitals
5. Design of European houses in the tropics.

It is not clear what type of reader the author had in mind in preparing the book; it is not a technical monograph because it is on general lines and is not always up to date, for example in the remarks on insecticides on page 262.

It is perhaps better to regard this volume as a collection of the opinions and experiences of the author, gained in many parts of the world and linked together against the backgound of the health developments on the Copper Belt of Northern Rhodesia. Some subjects are dealt with so briefly that it is hard to understand why they were included; for example, Chapter 37 deals with yellow fever, and within the limits of 3 pages the author sketches the history of the disease, the discovery of the vector, jungle yellow fever, prophylactic inoculation and the extension of the endemic yellow fever areas in Africa. Nyasaland is said to be within this area and no reference is made to the almost immediate retraction of this declaration by the World Health Organization. In Chapter 36 sleeping sickness, the tsetse flies, and cattle disease are discussed in a single page in less than 400 words, and Chapter 32 on African housing on mines has $2\frac{1}{4}$ pages.

There is a number of minor errors of fact and spelling, particularly in the spelling of African place names. On page 212 there is a number of inaccuracies in the short account of the founding of Southern Rhodesia, for example the 1889 Royal Charter to the British South Africa Company certainly did not give Rhodes any jurisdiction over the lands and people in the Matabele country.

[This volume is handsomely produced and profusely illustrated but is expensive. Many of the illustrations and maps could have been omitted, reducing the cost, without detracting from the volume.] *D. M. Blair*

Russell, Paul F. [M.D., M.P.H.]. **Paludismo. Compendio de Principios Basicos.** [Malaria: Basic Principles Briefly Stated.] Translated by Luis Vargas, M.D., M.P.H., M.C.Biol. & E. Bordas. pp. xvi + 205, 64 figs. (3 coloured on 3 pls.) 1953. Mexico: La Prensa Médica Mexicana, Durango, 145. [$6.50]

The original English version of this book was given a warm reception by Professor Macdonald in his review published in this *Bulletin*, 1952, v. 49, 734, and it is indeed difficult to think of a more accurate and comprehensive short exposition of an important subject.

Readers of Spanish who are interested in malaria must welcome the present complete translation of the book into that language. It contains the full text with all the illustrations, including the coloured plates of the parasites. The line drawings illustrating the anatomy of mosquitoes, and

other subjects, have been altered in the sense that their wording is now in Spanish; otherwise they remain the same. The half-tone illustrations are as in the original version. The book is printed on art paper throughout.

The translation is the work of Dr. Luis Vargas of the Instituto de Salubridad y Enfermadades Trópicales de México, whose work is well known to readers of this *Bulletin*, and Dr. E. Bordas of the Campaña Nacional contra el Paludismo. They are to be congratulated on carrying through so useful a task. *Charles Wilcocks*

Hirst, L. Fabian [M.D.]. **The Conquest of Plague. A Study of the Evolution of Epidemiology.** With a Foreword by William MacArthur, K.C.B., M.D., F.R.C.P. pp. xvi + 478, 16 figs., 6 pls. & 3 maps. 1953. Oxford: Clarendon Press London: Geoffrey Cumberlege, Oxford University Press, Amen House, Warwick Square, E.C.4. [42s.]

Dr. Fabian Hirst's name is familiar to all students of plague, chiefly on account of the important additions to our knowledge that he has made regarding the rôle played by fleas in the transmission of the disease. Those of us who have known of his activities during the last two decades have been looking forward with pleasurable anticipation to the publication of the results of his labours. We have not been disappointed. *The Conquest of Plague* is a fascinating book. In the author's words " it is not a history of plague epidemics nor a systematic textbook, but a study of human beliefs about the origin of the malady from the era of primitive man to the present day ".

The author has grouped his subject matter into four parts:

Part I. Traditional Conceptions of the Nature of Plague.

Part II. Modern Conceptions of the Nature of Plague.

Part III. The Spread of Plague in Time and Space.

Part IV. The Conquest of Plague.

No disease has received more attention from medical historians than has plague, probably because of the important influence that pandemics of that disease have had on the destinies of mankind. Dr. Hirst has overlooked nothing of significance in that dramatic story. Moreover, he has added a mass of interesting information, notably about plague epidemics during the 17th and later centuries, mostly culled from original sources, that will be new to the vast majority of readers. All this information has been put within the framework, as it were, of our present detailed knowledge of the nature of the disease. The complete picture is much more than the sum of its constituent parts.

Part II recounts the achievements of modern research workers in unravelling the mysteries of plague, from Yersin's discovery of the plague bacillus in 1894 to the present day. Here again no significant contribution to our knowledge appears to have been overlooked, and credit has been fairly distributed.

Most plague workers in the first quarter of this century much underestimated the important part played by infective *Xenopsylla cheopis*, separated from its rat host, in the transmission of plague infection over long distances, and the longevity of such fleas in favourable conditions. The work of the Indian Plague Research Commission was all done before it was discovered that Indian rat fleas of the genus *Xenopsylla*, which the Commission had considered a unique species *X. cheopis*, contained 3 distinct

species, *X. cheopis*, *X. astia* and *X. brasiliensis* with very different potentialities as vectors of plague. This partly explains the failure of the Commission to find an adequate explanation of the immunity to plague which large parts of India enjoyed—a problem to which it paid great attention. The all importance of *X. cheopis* as a plague vector and the negligible importance of *X. astia* in this respect, provide the key to the problem. In finding that key Dr. Hirst's contributions were of first class importance. All these and many other matters are fully discussed in Part III of the book.

Part IV contains a short account of the promising results obtained by chemotherapy during recent years in the treatment of the disease. The author justifies the title he has chosen for his book. " Victory over man's most ancient and most deadly enemy seems now to be at last in sight."

A second perusal has reinforced all the favourable impressions evoked by a first careful study of this book. It is easy to read and holds the attention from first to last. It should appeal to a very wide range of readers. Little or no technical scientific knowledge is necessary for the appreciation of a great story very well told. *Norman White*

MITSUDA, Kensuke [M.D.]. **Atlas of Leprosy.** [Papers on Leprosy, Vol. 6.] 8 + 80 pp., 109 figs. (49 coloured). 1952. Okayama: Chōtōkai Foundation, Japan.

A foreword tells how Mitsuda's interest in leprosy dates back to 1898 when he began treating leprosy patients at the Tokyo City Almshouse. His efforts contributed greatly toward the passage of the National Leprosy Prevention law in 1907. A list is given of 8 outstanding works of Mitsuda published from 1901 to 1937, but some 120 works are mentioned in all. The Kensuke Mitsuda Publication Committee has already published 5 volumes of papers, and " the pathological illustrations stemming from these studies are here published as Volume VI of this series ". The illustrations are the work of Toshihiko Ohashi of the Pathological Department of Keio University School of Medicine. The foreword ends thus: " with the realization this year of the completion of facilities for 12,500 leprous patients, and the possibility of total hospitalization for all those stricken with the disease, we sincerely hope and pray for Dr. Mitsuda's continued good health and strength, that he may further advance his work and studies, as is his wish, for the benefit of lepers not only in Japan but throughout the world ".

Apart from a short introduction of less than 3 pages the script of the Atlas is confined to a few lines of numbered captions and explanations of the plates. There are 109 plates in all, of which some 50 are beautiful colour drawings of microscopic sections, some stained with Ziehl-haematoxylin, others with Sudan-III-haematoxylin, haematoxylin-eosin, Bielschowsky's silver method, etc. There are some 45 clinical photographs, and at the end a few photographs of macroscopic pathological specimens. All the illustrations are beautifully executed and clear, and give an excellent idea of the microscopic and macroscopic changes in the various parts of the body affected, and in the various forms of leprosy.

Among the illustrations of greatest interest are those of the central nervous system. A cross-section is given of the thoracic spinal cord in neural leprosy, stained by Weigert's method for myelin sheaths, illustrating degeneration of the columns of Goll and Burdach. A high magnification shows the cervical anterior horn in lepromatous leprosy with leprotic vacuole degeneration of an anterior horn cell containing many bacilli, lepra bacilli

between the Nissl bodies and among the dendrites. Another shows granular bacilli in certain cells of the intervertebral ganglions. A section of the nucleus of the facial nerve in lepromatous leprosy shows invasion by lepra bacilli of a nerve cell and displacement of the cell nucleus by increase of bacilli inside it, and also vacuolar degeneration of a nerve cell caused by lepra bacilli. Similar findings are shown in the *nucleus ambiguus* which " is usually involved, next in frequency to the facial nerve nucleus ". Involvement of the Gasserian (semilunar) ganglion is also shown with swelling of the ganglion cells and vacuole formation and a few granular bacilli. The frequency of these pathological findings is not mentioned, but clear proof is given that the brain and spinal cord are directly invaded, at least in lepromatous leprosy. One interesting section taken in the acute process of lepra reaction shows a giant cell containing bacilli, alongside of 2 lepra cells with mild lipoid degeneration.

Bacilli are shown inside the elongated cells of the Achilles tendon. The disease in the testis is well illustrated by several sections. A section of the kidney shows thickening of Bowman's capsule, amyloid degeneration of the vascular walls of a glomerulus, lepra bacilli in the wall of a glomerular blood vessel and fatty degeneration of the convoluted tubule epithelium. A section of a peripheral nerve in neural leprosy shows what is labelled " lepra bacilli within the neural fibres ", but in another section a similar appearance is labelled " lepra bacilli on both sides of a Schwann's nucleus ". Leprosy and tuberculosis are shown side by side in a lymph node. One section of unique interest shows calcification of neural tissue in neural leprosy, the ulnar nerve being affected near the elbow, 50 years after the onset of disease: there is also a fracture of the ossified ulnar nerve resulting from flexion of the elbow. The sections of the eye, showing among other things the invasion of the cornea by lepra bacilli, are worthy of study.

These are only a few of the outstanding items of interest so well illustrated in this volume. It is much to be regretted that such a beautifully produced and useful volume should have even one, and that quite an unnecessary, defect; the text has many misspellings, and most of these are misplaced or inverted letters; a list of some 60 *errata* is appended.

The name of Mitsuda is second only to that of Hansen in the vocabulary of leprosy, and he is among the foremost in the addition that he has made to our knowledge of the disease. The fact that much of his work was written in Japanese has to a certain extent limited the knowledge of his writings. To mention a few of these works and the dates of their publication will illustrate the variety and value of his research: Tuberculosis and Leprosy Mixed Infection (1901); Leprotic Changes in the Central Nervous System (1906); Determination of Lipoids in Leprosy (1909); Determination of the Tuberculoid Type in Leprosy (1911); Vasectomy in Leprosy (1915); The Mitsuda Reaction (1919). The fact that Mitsuda at his advanced age is still engaged in the active fight against leprosy demonstrates his life-long devotion to this cause. *Ernest Muir*

MARTINI, Erich. **Lehrbuch der Medizinischen Entomologie.** [Textbook of Medical Entomology] 4th Edition. pp. xii + 694, 318 figs. 1952. Jena: Gustav Fischer. [DM. 38.]

This well-known textbook of medical entomology has reached its 4th edition and is now considerably larger than the original edition of 1923. Two new authors have contributed to the book; Professor F. PEUS of Berlin discusses fleas in the section dealing with arthropods as parasites, and

Dr. W. Reichmuth of Celle deals extensively with insecticides. The scope of the manual has been increased by extending the veterinary aspect and in consequence Professor Martini, in his foreword, states that he trusts the new edition will appeal to a wider circle.

The general presentation is much the same as in previous editions. Some of the text figures are reproduced from older authors and need replacement and in some cases are inaccurate, as for instance, the figure of the larva of *Culicoides* on p. 223. The sections dealing with "Arthropods as Parasites" and "Arthropods as transmitters of Disease" are well presented and contain additional information.

Those parts of the book which deal with Arachnids are not dealt with in as clear a manner as other subjects. The trombiculiid mites are placed under the heading Trombidiidae and some of the more recent work on this specialized group is not included. This is perhaps hardly surprising since most of the recent research which has been carried out during the war on scrub typhus and its vectors has been undertaken in countries outside Germany.

Inaccuracies are not infrequent. For example, on page 216 reference is made to Theodor's catalogue of the world species of *Phlebotomus* published in 1948, and which contains a list of the Australian species described by Tonnoir, yet later on page 220 it is stated that they are probably absent from Australia. It also seems unnecessary in a modern textbook to discuss the *Simulium* theory of the transmission of pellagra even if only the historical aspects.

Both Professor Peus's and Dr. Reichmuth's contributions are up to date and sound, though the key to the families of fleas could have been shortened to include only those families of some economic importance.

The book is well produced and a credit to its publishers. It is profusely illustrated and provided with an extensive bibliography. The price 38 DM. is by present day standards very moderate.

In the reviewer's opinion this book, while it covers the subject comprehensively, is somewhat disappointing since it may mislead those whose acquaintance with entomology is limited, particularly in the more detailed aspects.

M. Lavoipierre

Bequaert, J. C. **The Hippoboscidae or Louse-Flies (Diptera) of Mammals and Birds. Part I. Structure, Physiology and Natural History.** Reprinted from *Entomologica Americana*. 1953, Feb. 20 & May 26, vols. 32 & 33 (n.s.), 1–209; 211–442, 21 figs. [Numerous refs.]

This introductory first part of the monograph on the Hippoboscidae (louse flies) of mammals and birds is restricted to an account of their internal and external anatomy, physiology and bionomics, the last being discussed under the headings of Nourishment, Shelter and Reproduction; taxonomy is to be dealt with later in a second part of the work.

In the section on anatomy, in order to trace homologies, the author has used the tsetse fly for comparison because it appears to be structurally similar and is possibly the closest living relative of the hippoboscids.

These flies live exclusively on the fresh, fluid blood of warm-blooded invertebrates and frequent reference is made in this respect also to the feeding habits of tsetse flies. No known hippoboscid, however, numbers man among its normal or habitual hosts, though several species may be induced to bite if placed on the human skin, a few will attempt to bite

in the open, and some reliable records are quoted of flies observed biting man. It is however recorded that, during laboratory experiments, no louse fly has produced a viable larva when fed on a diet of human blood alone. Nevertheless, the possibility of the accidental or mechanical transmission to human beings of pathogenic infections of animals seems worth investigating.

Some account is given of the occurrence in these flies of bacteria, rickettsiae and protozoa, and published records of hippoboscidae as vectors of pathogenic micro-organisms, especially protozoa, are reviewed. Their association with other insects and with mites and fungi is also discussed.

An annotated list is given of the species found on birds and another of those found on mammals. This part of the monograph ends with a very brief reference to control measures which mentions the use of DDT and BHC.

The book contains a very full account of the main subject; the bibliography alone occupies 60 pages and the index 21. *H. S. Leeson*

Hopkins, G. H. E. & Rothschild, Miriam. **An Illustrated Catalogue of the Rothschild Collection of Fleas (Siphonaptera) in the British Museum (Natural History) with Keys and Short Descriptions for the Identification of Families, Genera, Species and Subspecies. Vol. I. Tungidae and Pulicidae.** pp. xv + 361, frontispiece, 466 figs. (1 coloured & 1 folding) & 45 pls. 1953. London: British Museum. [84s.]

It is the intention of the Trustees of the British Museum to publish a catalogue of fleas in what the title refers to as " the Rothschild Collection ", words which may be taken to include the whole collection of fleas in the national collection, not only those which were originally brought together by the late Charles Rothschild. The Museum contains specimens of about 1,100 out of the 1,350 known species and is very rich in types and material of special interest. The present volume, the first, deals with the fleas falling in the families Tungidae and Pulicidae. Volumes II to IV will deal with the rest of the Siphonaptera, and a classified list of hosts (mammals and birds) will be published separately.

The present volume contains some 360 pages and 45 plates, with more than 200 photomicrograph figures illustrating anatomical characters. There are very numerous line drawings in the text. The foreword gives a sympathetic account of the late Charles Rothschild and of his colleague Karl Jordan, to whom this volume is dedicated. The introduction explains exactly the scope of the book, which is essentially a catalogue of a collection, not a monograph of a group of insects. It contains a long glossary with numerous figures calling attention to points of anatomy. The rest of the volume contains keys to families, genera and species. Under each species, after any necessary synonymy, there are descriptions and figures of males and females, and a catalogue of all the specimens in the collection. The present volume contains genera of great medical interest, *Tunga*, *Pulex* and *Xenopsylla*. It will be of great service to specialist workers, particularly in Africa, who need to make critical identifications of numerous species of the last genus.

The catalogue is a remarkable publication, a full and critical piece of work. The authors and publishers are to be congratulated on a production which is unrivalled among present day books. The style of the text might perhaps be described as severe. *P. A. Buxton*

Selle, W. A. [Ph.D.]. **Body Temperature: its Changes with Environment, Disease and Therapy.** pp. v + 112, 23 figs. 1952. Springfield: Charles C. Thomas, 301–327, East Lawrence Avenue, Illinois, U.S.A. & Oxford: Blackwell Scientific Publications, Ltd. [25s.]

This book bridges the gap between the physiological and clinical aspects of thermal homeostasis. It opens with a discussion of the range of normal body temperature and the physiological causes of variation, such as diurnal rhythm, activity and the menstrual cycle. Here the American preference for 98·6° instead of 98·4°F. as the average normal oral temperature may be tolerated, but the reviewer does not accept 1°C. (= 1·8°F.) as the usual difference between oral and rectal readings (this is usually given as 0·8°F.).

The chapters on heat production, heat loss and integrated temperature control are well written, but it should be noted that it is basal metabolism, and not " metabolism " as stated on page 37, which is alleged to be reduced in women after only a few hours' exposure to heat.

The prevailing evidence on neural mechanisms of homeostasis is aptly summarized. This is followed by chapters on internal and environmental disturbances of temperature regulation. The statement is misleading that water-soluble vitamins are lost in appreciable amounts in sweat; later work than that cited indicates that, with the possible exception of nicotinic acid, losses of vitamins in the urine exceed those in sweat.

One has sympathy with the author in his attempts to define and classify the various forms of heat collapse, which are at present in a chaotic state, but the account given here renders the position if possible more obscure by reviving sunstroke as an entity separate from heat-stroke and adding a new variety " simple heat collapse ".

The author does not mean by " simple heat collapse " the syncope caused by pooling of blood in the skin without sodium chloride deficiency or any apparent upset of body chemistry, which undoubtedly occurs. It is described as a shock-like condition with weakness, vomiting, fatigue, cramps and transient loss of consciousness. How is this condition to be distinguished from heat exhaustion due to salt deficiency as described by Ladell *et al.* [this *Bulletin*, 1945, v. 42, 143], or for that matter how is either condition to be differentiated from heat cramps?

Following the classification of Ladell the author has included thermal anhydrosis or tropical anhydrotic asthenia as a subheading of heat exhaustion but it would seem better to give this relatively clear-cut syndrome a separate name leaving heat exhaustion to cover sodium chloride deficiency dehydration with or without cramps.

Although the sun may contribute to collapse in the heat by virtue of its ultra-violet as well as its heat rays, evidence is lacking of any difference in the final effects; for the common condition the name heat-stroke appears preferable to sunstroke.

Included in this chapter is a section on cold exposure. On the vital question of how best to resuscitate critically chilled persons the method of rapid rewarming by immersion in water at 122°F. (50°C.) as concluded from the Dachau experiments, is found to give better results than slow rewarming. The value of heparin in preventing permanent damage after frostbite is still unsubstantiated. The book concludes with a short chapter on cold and heat sensitivity.

The subject matter is well chosen and arranged, and information is included from a wide range of sources. Readers who are on guard for the occasional uncritical statement will undoubtedly gain from the hundred

pages of this book as complete a picture as is at present possible of body temperature control and the causes and consequences of departure from normality. *M. L. Thomson*

CORNET, René J. **Maniéma: Le Pays des Mangeurs d'Hommes [Tome I].** [Maniema: The Country of the Cannibals] 347 pp., illust.

SYMÉTAIN. **Maniéma: Le Pays de l'Etain [Tome II].** [Maniema: The Tin Country] 391 pp., illust. 1952. Brussels: L. Cuypers, 108 Ave. des Cerisiers.

The first volume by M. René Cornet opens with a description of the heroic days of the nineteenth century when LIVINGSTONE, CAMERON and STANLEY explored the country between the Congo and the Great Lakes.

The slave raiding under Tippu Tib and the Arab wars are described in detail and the various missionary enterprises outlined, including an account of the intuitions and enthusiasms of the recluse Robert ARTHINGTON of Leeds whose generosity challenged and inspired many pioneer ventures.

There is a gruesome account of STANLEY's hospital ship, a large dug-out canoe towed by the whale boat *Lady Alice* down the Lualaba. In it were 60 sick folk of his expedition, and 3 or 4 corpses were jettisoned daily, victims of smallpox, dysentery and pneumonia. Three of Tippu Tib's wives died actually on the *Lady Alice* and met the same fate.

The story of the conquest of sleeping sickness in the Maniéma includes an account of the Mission from the Liverpool School of Tropical Medicine consisting of DUTTON, TODD, CHRISTY, THOMAS and BREINL. Sir Winston Churchill is reported as having stated in the House of Commons in 1906 that the population of Uganda had been reduced from 6½ to 2½ millions by this disease.

M. Cornet's historical account is well illustrated and serves as a good introduction to its companion volume, "*Maniéma. Le Pays de l'Etain*".

In the second volume, which is by several authors, the geography and geology of the Maniéma, that tract of land between the Lualaba and the Great Lakes, are described in detail and the discovery of tin, and methods used for its exploitation, are very fully dealt with.

Medical readers will find some very interesting and instructive chapters on the way in which the *Société Symétain* has tackled the problems of maintaining the health of its white and black personnel. They are from the pen of the Chief Medical Officer of the company Dr. Octave Balza and contain well documented opinions and descriptions of the tasks and the results achieved.

The problem of the "acclimatization" of raw Africans and of the hygiene of their camps is followed by comparative studies of morbidity and mortality of adults and children throughout the years, and a remarkable improvement is recorded. Methods of malaria control by chemoprophylaxis and the use of DDT are compared. Attempts to produce progressive tolerance to malaria in children have been abandoned in favour of more adequate suppressive dosage with either mepacrine or nivaquine. Iron deficiency anaemia is noted in children, apart from malaria, and sicklaemia occurs in 4 to 25 per cent. A large proportion of the inflated profits of the war years were devoted to the creation of an autonomous welfare agency named the *Fondation Symétain* and the way it has developed its many sided activities is well described by Mr. S. LAUWERS. The whole volume is a tribute to its authors and a fascinating story of the transmutation of a buried treasure into health, happiness and prosperity for a primitive people, hitherto inveterate cannibals. *C. C. Chesterman*

TENDEIRO, João. **Febre Q.** [Q Fever.] Publicações do Centro de Estudos da Guiné Portuguesa No. 16. pp. xv+337, numerous illustrations. [Bibliography.] 1952. Bissau.

This is a remarkable book by a veterinary worker whose list of articles published, or in the press, since January 1950 includes 34 papers and two other large memoirs in the same series as the present one. His memoir, "Studies of Murine Typhus in Portuguese Guinea," has already been reviewed [this *Bulletin*, 1951, v. 48, 881], and this volume deserves equal praise.

The first chapter, of 71 pages, contains an excellent account of the early history of Q fever and of the geographical distribution of the disease in 20 countries. There are numerous quotations in the original English from the classical articles by DERRICK and BURNET and their fellow workers in Australia, and by COX, DAVIS, PARKER and others in the U.S.A. Throughout the book free use is made of extracts from important papers in English and French; this feature with the excellent bibliography, containing 196 detailed references, and the numerous illustrations will appeal to a wide range of readers.

The fourth chapter contains a key to the identification of the ticks of Portuguese Guinea, illustrated by 17 plates, mostly by the author, and notes on each species of tick from which the author has isolated *Coxiella* [*Rickettsia*] *burneti*—one strain from each tick unless otherwise stated. The ticks found infected were:—*Amblyomma variegatum* (5 strains from ticks on cattle, one each from an African partridge and a guineafowl). *A. paulopunctatum* from a hippopotamus; *A. splendidum* from a buffalo; *A. nuttalli* from a lizard; *Haemaphysalis leachi*, one strain from a civet cat and one from a leopard; *Rhipicephalus sanguineus* from a dog; *R. simus simus* from a cow; *R. cuspidatus* from an anteater; *Hyalomma savignyi* from a cow; *Palpoboophilus decoloratus* from a cow; *Argas persicus* (2 strains from domestic fowls); *Aponomma halli* (a new species described by the author, one strain from a lizard and one from an iguana). Six strains were isolated from cows' milk and 2 from goats' milk.

The isolation of the strains was by inoculation of animals, mostly white rats, which were found much more suitable than guineapigs. Nearly all the rats died, so that cross-immunity tests had to be made with monkeys. For the identification of the strains reliance was placed chiefly on the finding of rickettsiae in smears of the organs of the infected rats; very few rickettsia-agglutination tests could be done because of the great cost of the commercial antigen; no complement-fixation tests or yolk-sac cultures are mentioned, and the number of negative findings is not stated. It would be interesting to know how closely these strains are related to the standard strains from other parts of the world. Apart from a reference to the possible occurrence of the disease in man in Portuguese Guinea, contained in the preface by the Director of the Institute of Tropical Medicine of Lisbon, there is no mention of cases of the human disease in the area.

A detailed description is given of the successful inoculation of 2 domestic fowls, in one of which the rickettsia-agglutination reaction reached a titre of 1/10 and in the other there was a partial reaction at this titre. The inoculation of calves, kids, rabbits, and monkeys is described; in each case the strain was transferred to white rats. In one monkey the rickettsia-agglutination reaction after reinoculation in the course of a cross-immunity test rose to 1/60. *John W. D. Megaw*

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Am.	signifies	Amoebiasis and Intestinal Protozoal Infections.	Lep.	signifies	Leprosy.
Bart.	„	Bartonellosis.	Mal.	„	Malaria.
Bl.	„	Blackwater Fever.	Misc. Dis.	„	Miscellaneous Diseases.
B.R.	„	Book Review.	Oph.	„	Tropical Ophthalmology.
Chl.	„	Cholera.	Pl.	„	Plague.
Def. Dis.	„	Deficiency Diseases.	Prot.	„	General Protozoology.
Den.	„	Dengue and Allied Fevers.	Rab.	„	Rabies.
Der.	„	Dermatology and Fungus Diseases.	R.F.	„	Relapsing Fever and other Spirochaetoses.
Ent.	„	General Entomology and Insecticides.	Reports, etc.	„	Reports, Surveys and Miscellaneous Papers.
Ep. Dropsy	„	Epidemic Dropsy.	Sp.	„	Sprue.
Haem.	„	Haematology.	Tryp.	„	Trypanosomiasis.
Heat Str.	„	Heat Stroke and Allied Conditions.	Typh.	„	Fevers of the Typhus Group.
Hel.	„	Helminthiasis.	Ulc.	„	Tropical Ulcer.
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Beattie, C. P., with Beverley, 565 (Prot.)
Beatty, M., with Levine, Chung-Hoon, Ichiriu & Arakaki, 123 (Lep.)
Beaudiment, R. & Zozol, R., 687 (Tryp.)
Beaver, E. L., with McRary & Noble, 918 (Tryp.)
Beaver, P. C., 229, 737 (Hel.)
Bechelli, L. M., 1051 (Lep.)
—— & Quagliato, R., 1055 (Lep.)
——, with Souza & Ferraz, 1055 (Lep.)
Bechtold, J. E., with McHardy, Welch & Browne, 939 (Am.)
Beck, J. W., 641 (Hel.)
Becker, E. R. & Schwink, T. M., 603 (Mal.)
Beckett, A. H. & Dombrow, M., (45) (Hel.)
Begani, R., with Bocchetti, 323 (Hel.)
Beisel, W. R., with Wurl & Gillespie, 87 (Mal.)
Belding, D. L., 588 (B.R.)
Belhommet, F., 957 (Hel.)
Bell, E. J. & Pickens, E. G., 922 (Typh.)
Bell, F., 286 (Tryp.)
Bell, J. F., with Parker, Chalgren, Thrailkill & McKee, 399 (Typh.)
Bell, S., 1138 (R.F.)
Bellamy, R. E. & Reeves, W. C., 459 (Ent.)
Bellon, J., (496) (Leish.)
Beltrán, E., (307) (Am.)
Benaím Pinto, H., 245 (Der.)
——, with Pifano C., 201 (Tryp.)
Benazzi, P., with Mantovani, 617 (Typh.)
Benetazzo, B. & Cicchini, T., 21 (Leish.)
Bensted, H. J. & Atkinson, J. D., 827 (Hel.)
Bequaert, J. C., 1182 (B.R.)
Béquignon, R., Guichard, A. & Vialat, C., 1134 (Rab.)
—— & Vialat, C., (1038) (Rab.)
Berck, B., (1176) (Ent.)
——, with Fredeen & Arnason, 769 (Ent.)
Beresowski, A. & Lundie, J. K., 59 (Def. Dis.)
Berge, T. O. & Lennette, E. H., 698, 700 (Typh.)
v. Bergmann, G., 357 (B.R.)
Bergouniou, J. L., 238 (Def. Dis.)
Berkeley, W., with Conway, (559) (Der.)
Bermann, R., 946 (Lep.)

Berndt, W. L., 580 (Ent.)
Bernet, A., 374 (Mal.)
Berney, B., with Gelfand, 1036 (Typh.)
Bertazzi, C. G., 451 (Misc. Dis.)
Bertcher, R., with Meyer, 331 (Sp.)
Bertcher, R. W. & Meyer, L. M., 331 (Sp.)
Berthong, M., with Green & Conley, 846 (Haem.)
Berti, F. A., Ziti, L. M., Perego, C., Rzeppa, H. W., Rieckmann, B. H. G. & Rapp, O. P., 425, (723) (Lep.)
Bertram, D. S., 834 (Hel.), 910 (Mal.)
Bertrand, M., with Thys, Courtois, Vanbreuseghem, Baker, de Muyncke, Limbos & Verselder 444 (Der.)
Bessuges, J., 819 (Lep.)
Bettini, S. & Cantore, G., 850 (Vms.)
Bettinotti, C. M., 292 (Tryp.)
Bevacqua, R., 962 (Hel.)
Beveridge, E., with Walls, 94 (Tryp.)
Beverley, J. K. A. & Beattie, C. P., 565 (Prot.)
Bevier, G., Torres-Muñoz, N. & Doria-Medina, J., 926 (Y.F.)
Beye, H. K., with Edgar, Mille, Bambridge & Lamarquand, 539 (Hel.)
——, Edgar, S. A., Mille, R., Kessel, J. F. & Bambridge, B., 47 (Hel.)
——, Kessel, J. F., Heuls, J., Thoóris, G. & Bambridge, B., 738 (Hel.)
Bhaduri, N. V. & Chowdhury, A. B., 834 (Hel.)
—— & Sanyal, P. K., 1069 (Hel.)
Bhatia, S. C., with Viswanathan & Rao, 673 (Mal.)
Bhattacharjee, B., with Sen Gupta, 1030 (Leish.)
—— & Sircar, P., (813) (Am.)
Bhattacharyya, B., with Sen Gupta, Das & Sanyal, 97 (Leish.)
Bhattacharyya, K., with De & Raychaudhury, 214 (Chl.)
Bhende, Y. M., with Purandare, Figueredo & Desai, 497 (Leish.)
de Biagi, A. M. de B., with Biagi F., 1132 (Leish.)
Biagi F., F., 1031 (Leish.), (1047) (Am.)
—— & de Biagi, A. M. de B., 1132 (Leish.)
Bianco, I., Montalenti, G., Silvestroni, E. & Siniscalco, M., 438 (Haem.)
——, with Silvestroni, 333 (Haem.)
Biber, S. H., with Jutzy, Elton & Lowry, 554 (Vms.)
Bicalho, J. C., with Pinto, 494 (Tryp.)
——, with —— & Guedes, 491 (Tryp.)
Bidart, J. & Racoillet, R., 974 (Oph.)
Biguet, J., with Coutelen, Doby & Deblock, 44 (Hel.), 345, (1083) (Prot.)
——, with ——, Obez & Lefrançois, 140 (Hel.)
Biheu, O., with Schneider & Montézin, 483 (Mal.)
Bilger, I., 64 (Oph.)
Bingel, K. F. & Engelhardt, H., 104 (Typh.)
Bintari Sumardjo & Lie Kian Joe, 626 (Am.)
Biocca, E. & Massi, O., 322 (Hel.)
Birnbaum, D., with Bachrach, Gurevitch & Landau, 559 (Oph.)
Birrell, J. H. W., 1144 (Lep.)
Birsner, J. W., with Dykes & Segesman, 557 (Der.)
Bishop, A. & McConnachie, E. W., 387 (Mal.)
Bishopp, F. C., (161) (Ent.)
Björkenheim, G., 965 (Haem.)
Blache, R., with Montestruc & Martin de Mirandol, 811 (Am.)
Black, D. A. K., (852) (Heat Str.)
Black, J., with Koprowski, 303 (Rab.)
Black, R. H., 284, 1000 (Mal.)
Blair, D. M., 910 (Mal.)
Blakeslee, T. E., 251 (Ent.)
Blanc, F., Martin, M., Villa, T. & Mayan, L., 414 (Am.)
—— & Navaranne, P., 938 (Am.)
Blanc, M. & Prost, M. T., 1056, 1057 (Lep.)
Bland, R. H., 127 (Lep.)
Blanton, F. S., with Wirth, (865) (Ent.)
Bławat, F., with Kozar & Wysocka, 236 (Hel.)
Blumberg, B., McGiff, J. & Guicherit, I., 1067 (Hel.)
Blumenthal, H. T., with Greiff, Chiga & Pinkerton, 399 (Typh.)
Boase, A. J., 447 (Oph.)
Bobo Morillo, T., (698) (Typh.)
Bocchetti, G. & Begani, R., 323 (Hel.)
Bodenstein, O. F., with Fales & Piquett, 167 (Ent.)
Bogaert, W., 1078 (Ulc.)
Bogliolo, L. & Neves, J. A., 969 (Der.)
Bogue, M. D., with Maier, Baker, Kilpatrick & Quarterman, 350 (Ent.)
Bohart, R. M., with Bailey, 504 (Den.)
Boidé, D., with Giroud, Humann & Faucheux, 502 (Typh.)
Boiron, H., (260) (Ent.)
—— & Camain, R., 929 (Rab.)
Boithias, M., with Toulant, 448, 850 (Oph.)
Bolivia: Ministerio de Higiene y Salubridad, 581 (Reports, etc.)
van Bommel, L. B., 205 (Typh.)
Bonatti, A., with Negroni, Briz de Negroni, Daglio & Vivancos, 441 (Der.)
Bond, H. W., with Nolan & Mann, 1061 (Hel.)
Bonnet, D. D. & Gross, B., 1038 (Pl.)
Bonnet, M., with Lacroix & Mazzuca, 187 (Mal.)
Bonnin, H., Moretti, G. F. & Leproux, P. H., 79 (Mal.)
von Bonsdorff, B., 736 (Hel.)
—— & Gordin, R., 44 (Hel.), 553 (Haem.)
Boquet, P., Bussard, A. & Izard, Y., with Lesimple, D., 243 (Vms.)
——, with Izard, 849 (Vms.)
Borba, A. M., with Rachou, 82 (Mal.)
Bordas, E., Navarro, L. & Downs, W. G., 376 (Mal.)
——, with Vargas, 1178 (B.R.)
Borer, F., with Baud, 410 (Am.)
v. Bormann, F., 295 (Typh.)
Borzone, R. A. & Lapieza Cabral, P., (762) (Prot.)
Bose, A. N. & Bose, S., (916) (Tryp.)
Bose, R., with Chatterjee, 1148 (Lep.)
Bose, S., with Bose, (916) (Tryp.)
Boshoff, P. H., with le Riche, Kinnear, Loewenthal & Smit, 548 (Def. Dis.)
Bothwell, T. H., van Doorn-Wittkampf, H. van W., du Preez, M. L. & Alper, T., 964 (Def. Dis.)
Bouckaert, J. J. & Reul, R., 72 (Reports, etc.)
Boughton, C. R. & Bearup, A. J., 1047 (Am.)
Bouillat, M., with McCrumb, Mercier, Robic, Smadel, Woodward & Goodner, 933 (Pl.)
Bourgain, M., Mollaret, L. & Chambry, J., 815 (R.F.)
Bourns, T. K. R., 839 (Hel.)
Bousser, J., Antonelli, J., Audry, M. & Laplanche, C., (845) (Haem.)
Bouvier, G., 574 (Ent.)
Boxus, V. & Adant, M., 662 (Reports, etc.)
Boyd, J. S. K., 85, 380, 1118 (Mal.)

Bozicevich, J., with Thomas & Hoyem, 750 (Hel.)
Bradbury, F. R., with Armstrong & Britton, (350) (Ent.)
Bradin, J. L., Jr., 1138 (Am.)
Bradner, W. T., 937 (Am.)
Braganca, B. M. & Quastel, J. H., 338 (Vms.)
Bragdon, D. E. & McManus, J. F. A., 439 (Vms.)
Brain, P., 241 (Haem.)
Brand, P. W., 950 (Lep.)
von Brand, T., 363 (B.R.)
——, with Tobie, 916 (Tryp.)
Brandão, C. H., with de Macedo & Monteiro, 209 (Typh.)
Brandenburg, H., 622 (Rab.)
Brando, N. N., with Ramos, Lacerda & Sampaio, (1028) (Tryp.)
Brandt, M. C., with McCowen, Callender & Lawlis, 710 (Am.)
Brannon, C. C., with Farrar, 864 (Ent.)
Brant, T. C., with Dias, 693 (Tryp.)
——, with —— & Santos, 494 (Tryp.)
Braun, H. A. & Stonehill, R. B., (413) (Am.)
Bravo Oliva, J., with Piédrola Gil, 213 (Rab.)
Bray, B., 550 (Def. Dis.)
Bray, R. S. & Garnham, P. C. C., 1121 (Mal.)
Brazzaville, 1102 (Reports, etc.)
Breland, O. P., 461 (Ent.)
——, with Buxton, 250 (Ent.)
Brener, Z., with Pellegrino, 493 *ter.* (Tryp.)
Brennan, J. M. & Harwood, R. F., 1170 (Ent.)
Breslau, A. M., with Tarbet, 970 (Der.)
Breslin, D., with Rigdon & Micks, 386 (Mal.)
Briceño Maaz, T., (206) (Typh.)
Briones, S., with Romaña & Scheffels, 1129 (Tryp.)
Briscoe, M. S., 1003 (Mal.)
Briski, B., with Čmelik, (960) (Hel.)
British Med. J., 384 (Mal.)
British Standard 1831, 577 (Ent.)
Britschgi, M. B., with Burroughs, 932 (Pl.)
Britton, H. G., with Armstrong & Bradbury, (350) (Ent.)
Briz de Negroni, C., with Negroni, Daglio, Vivancos & Bonatti, 441 (Der.)
Brooke, M. M., with Martin, Garfinkel, Weinstein & Frye, 710 (Am.)
Brooks, C. P., 731 (Hel.)
Brooks, W., with Aikawa & Harrell, 922 (Typh.)
Brounst, G. & Naffah, N., 831 (Hel.)
Brown, A. E., with Dowsett, 838 (Hel.)
Brown, A. W. A., 254 (Ent.)
——, with Sippell, 571 (Ent.)
—— & Watson, D. L., 1171 (Ent.)
Brown, H. D., with Rogers, Rasmussen & Heal, (984) (Ent.)
Brown, J. A. K., 418, 951 (Lep.)
Brown, J. H., (155) (Misc. Dis.)
Brown, J. S., 986 (Reports, etc.)
Brown, W. O., 844 (Haem.)
Browne, D. C., with McHardy, Bechtold & Welch, 939 (Am.)
Browning, C. H., Adamson, H. & Keppie, A. A. N., 1026 (Tryp.)
Bruce, H. B., with Gunther, 285 (Bl.)
Bruce-Chwatt, L. J., 596, 901 (Mal.)
—— & Archibald, H. M., 477 (Mal.)
Brueckner, A. L., with Reagan, 25, 212 (Den.)
——, with —— & Day, 404 (Rab.)
——, with ——, ——, Moore & Kehne, 506 (Rab.)
Brumpt, L. C., 135, 430 (Hel.), 645 (Haem.), 672 (Mal.)
Brunetti, O., with Abinanti, Welsh & Lennette, 699 (Typh.)
Brygoo, E., 154 (Misc. Dis.)
Brygoo, E. R., 853 *bis* (Misc. Dis.)
—— & Aigle, G., 324 (Hel.)
——, with de Lajudie, 649 (Misc. Dis.)
—— & Richard, C., 344 (Misc. Dis.)
Buchman, E., Kullman, H. J. & Margonis, G. F., 308 (Am.)
Bück, G., Courdurier, J. & Quesnel, J. J., 602 (Mal.)
——, with —— & ——, 301 (Typh.)
Bucki, A. J., with Wells, 813 (Am.)
Budden, F. H., with Davenport, 849 (Vms.)
Bueding, E., 224, 961 (Hel.)
——, Peters, L., Koletsky, S. & Moore, D. V., 533 (Hel.)
Buell, B. G., with Johnson, (85) (Mal.)
Bugher, J. C., with Hahn, 807 (Y.F.)
Buhn, W. H., with Vivell, 568, 1166 (Prot.)
Buker, R. S., 1146 (Lep.)
Bulletin of the National Society of India for Malaria and Other Mosquito-borne Diseases, 986 (Reports, etc.)
Bull. World Health Organization, 1099 (Ent.)
Bullock, W. L., (751) (Hel.)
Bumbalo, T. S., Gustina, F. J. & Oleksiak, R. E., 838 (Hel.)
Bunker, N. C., with Halstead, 556 (Vms.)
Bunn, R. W., 399 (Typh.)
Burch, T. A., with Gibson, 639 (Hel.)
Burckhalter, J. H., with Edgerton, (120) (Am.)
Burdin, M. L. & Plowright, W., 489 (Tryp.)
Bureau Permanent Interafricain de la Tsé-Tsé et de la Trypanosomiase, 606 (Tryp.)
Buren, W. F., with Norris, Schneider, Hanchett & Kohler, 1135 (Pl.)
Bürger, H., with Garcia & de Mattos, 960 (Hel.)
Burgess, R. C. & Laidin Bin Alang Musa, 549 (Def. Dis.)
Burgess, R. W., with Young, 598 (Mal.)
Burke, J., 688 (Tryp.)
Burke, R. C., Salvin, S. B. & Gerloff, R. K., 339 (Der.)
Burkhardt, C. C. & Dahm, P. A., 1091 (Ent.)
Burkinshaw, J., Kirman, B. H & Sorsby, A., 568 (Prot.)
Burnett, G. F., with Davidson, 191 (Mal.)
Burnod, M., 728 (Hel.)
Burroughs, A. L., with Britschgi, M. B., 932 (Pl.)
Burrows, W., 1039 (Chl.)
—— & Ware, L. L., 1041 (Chl.)
Burton, G. J., (857) (Ent.)
Burtt, E., 287, 394, 801 (Tryp.)
Bushby, S. R. M., with Barnett, 522 (Lep.)
Buso, R., with Suárez, Sabater & Suárez, 143 (Sp.)
Bussard, A., with Boquet, Izard & Lesimple, 243 (Vms.)
Busson, F., with Linhard, Giraud & Guyonnet, 840 (Def. Dis.)
de Bustamante, F. M., 89, 1014 (Mal.)
—— & Gusmão, J. B., 1129 (Tryp.)
Busvine, J., 910 (Mal.)
Busvine, J. R., 657 (Ent.)
—— & Nash, R., 1176 (Ent.)
Butler, J. M., with Grundmann & Selin, (1157) (Hel.)

Butts, J. S., with Gjullin & Lindquist, 253 (Ent.)
Buxton, J. A. & Breland, O. P., 250 (Ent.)
Buxton, P. A., 834 (Hel.)

C

Caballero y C., E. & Grocott, R. G., 1071 (Hel.)
del Río Cabañas, J. L., 1162 (Oph.)
Cabannès, R., with Sarrouy, Sendra & Zevaco, 439 (Haem.)
Cabrera M., J. I., McAnally, W. J., Jr. & Montoya, J. A., 697 (Typh.)
Callender, M. E., with McCowen, Lawlis & Brandt, 710 (Am.)
Calma, V. C., with Micks, 1096 (Ent.)
Calverley, E. T., 1113 (B.R.)
Cambournac, F. J. C., Roque, R. de A. & Rés, J. F., 1139 (R.F.)
Camain, P., with Lemaire, Postel, Leduc & Ehrhard, 968 (Vms.)
Camain, R., 1057 (Hel.)
——, with Boiron, 929 (Rab.)
——, with Navarranne & Paris, 1079 (Misc. Dis.)
——, with Payet, 318 (Hel.)
—— & Pierchon, M., 438 (Def. Dis.)
Cameron, J. A. P., with Smadel, Ley & Diercks, 207 (Typh.)
Campau, E. J., Baker, G. J. & Morrison, F. D., 1096 (Ent.)
Campbell, D. H., with Goodman, 846 (Haem.)
Campillo S., C., with Báez Villaseñor, Ruiloba, Rojas & Treviño, (497) (Leish.)
Campos, J. A., (147) (Der.)
Campos, R., with Coutinho, Croce & Amato Neto, 537, 828 (Hel.)
Canet, J., 908 (Mal.)
——, with Bablet & Kviatkovsky, 438 (Def. Dis.)
—— & Farinaud, E., 278 (Mal.)
—— & Ghéstin, F., 118 (Am.)
Cantore, G., with Bettini, 850 (Vms.)
Canto Rodriguez, F., with Convit, Rassi & Contreras, 421 (Lep.)
Cantrell, W., 917 (Tryp.)
Cao-Pinna, M., with Lippi & Capocaccia, 411 (Am.)
Capocaccia, L., 411 (Am.)
——, with Lippi & Cao-Pinna, 411 (Am.)
Carayon, A., 674 (Mal.)
Carayon, M., Lahitte, F. G. & d'Almeida, 450 (Ulc.)
Carboni, E., with Fernandez, 36 (Lep.)
Cardaire, G., with Gallais, Planques, Pruvost, Cros & Nabholtz, 552 (Haem.)
Cardama, J. E., with Gatti, 423 (Lep.)
Cardoso, R. A. de A., with de Souza-Araujo, (522) (Lep.)
Carlos Gyorko, A., 520 (Lep.)
Carminati, G. M., with Ercoli, 418 (R.F.)
Carney, D. M., with Moore, Thillet & Meleney, 954 (Hel.)
Carouso, N., with Garber & Noble, 933 (Pl.)
Carpenter, S. J., Galindo, P. & Trapido, H., 211 (Y.F.)
Carrera, G. M., with Everritt & Sadun, 937 (Am.)
—— & Sadun, E. H., 412 (Am.)
——, —— & Faust, E. C., 309 (Am.)
Carrera Cobos, T., 918 (Leish.)
Carrère, L. & Roux, J., 1039 (Chl.)
Carrescia, P. M., 478 (Mal.)
Carter, F. S., 1064 (Hel.)
de Carvalho, A., 1076 (Der.)
Carvalho, C. M., with Hadler & Mauri, 425 (Lep.)
——, with Planet, Oliveira & Mauri, 724 *bis* (Lep.)
de Carvalho, M. da C. M., with Machado Filho, 972 (Der.)
Carvalho, P. J., with Corrêa & Lima, 692 (Tryp.)
Casile, M. & Saccharin, H., 740 (Hel.)
Casillas, J., with Ruiz-Sánchez, Quezada, Paredes & Riebeling, 380 (Mal.)
de Castro, J. A., with Dias, Pinto & Pellegrino, 611 (Tryp.)
Castro Estrada, S., with González Ochoa, Martínez Báez & Lavalle Aguilar, 220 (Lep.)
Catchpole, B. N. & Snow, D., 43 (Hel.)
Cattan, R., Frumusan, P. & Lumbroso, P., (1156) (Hel.)
Caullery, M., 470 (B.R.)
Cavaceppi, L., with Corradetti, 91 (Mal.)
Cavanaugh, D. C. & Quan, S. F., 931 (Pl.)
Ceccaldi, J., 288, 609 (Tryp.), 1102 (Reports, etc.)
——, Saint-Etienne, J. & Audebaud, G., (928) (Rab.)
——, Trinquier, E. & Arnoult, H., 93, (610) (Tryp.)
Celerier, with Duroux, Jarniou & Colas, (343) (Misc. Dis.)
Cezar de Andrade, L. M., with Azulay, 948 (Lep.)
Chabaud, A. G., with Galliard, 827 (Hel.)
Chadwick, L. E., with Barnhart, 573 (Ent.)
Chakravarti, A., 1044 (Am.)
Chakravarty, N. K. & Chaudhuri, R. N., 479, 794 (Mal.)
——, with ——, 676 (Mal.), 1161 (Ep. Dropsy)
——, with ——, Ghosal & Mondal, 810 (Chl.)
Chakravarty, R. K., 352 (Lab.)
Chalgren, W. S., with Parker, Bell, Thrailkill & McKee, 399 (Typh.)
Chalmers, J. N. M., Ikin, E. W. & Mourant, A. E., 965 (Haem.)
Chamberlain, D. M., Docton, F. L. & Cole, C. R., 652 (Prot.)
Chamberlain, W. P., Jr., 340 (Oph.)
Chambers, H. D., 977 (Misc. Dis.)
Chambon, Y. & Galea, M., 506 *bis* (Rab.)
Chambry, J., with Bourgain & Mollaret, 815 (R.F.)
Chance, M. R. A. & Mansour, T. E., 825 (Hel.)
Chand, D., with Srivastava, 280 (Mal.)
Chandler, B. F. & Kehoe, E. L., (243) (Haem.)
Chandler, R. L., 18 (Tryp.)
——, with Goodwin, (201) (Tryp.)
——, with Unsworth, (292) (Tryp.)
Chandy, P. J., with Gupta, Mehrotra & Mangalik, 629 (Lep.)
Chang, S., 613 (Typh.)
——, Snyder, J. C. & Murray, E. S., 613 (Typh.)
Chang, Y. T., 1150, 1151 (Lep.)
Chang, Y. Y., with Lu & Yu, (628) (Ys.)
Chardome, M., with van Hoof & Peel, 184 (Mal.)
Charles, L. J., 373 (Mal.), 1088 (Ent.)
Charles, P., with Louis, 868 (Reports, etc.)
——, with van Oye, 58 *bis* (Def. Dis.)
Charmot, G., Le Henand, F. & Giudicelli, P., 941 (R.F.), 1045 (Am.)
——, ——, Mathieu, P., Sylla & Ouedraogo, Y., 118 (Am.)
Chassignet, R., with Le Gac & Floch, (256) (Ent.)

Chastel, C., with Coudert, 678 (Mal.)
Chatterjee, K. D., 868 (B.R.)
Chatterjee, K. R. & Bose, R., 1148 (Lep.)
——, with Dharmendra, 35 (Lep.)
Chatterjee, S. N., with Dharmendra, (34), (1145) (Lep.)
——, with —— & Sen, 34 (Lep.)
Chatterji, S. N., with Dharmendra, 1145 (Lep.)
——, with —— & Mukerjee, 721 (Lep.)
Chaudhuri, R. N. & Chakravarty, N. K., 676 (Mal.), 1161 (Ep. Dropsy)
——, with ——, 479, 794 (Mal.)
——, Ghosal, S. C., Mondal, A. & Chakravarty, N. K., 810 (Chl.)
Chaussinand, R., 818, 1143 (Lep.)
——, Viette, M. & Krug, O., 523 (Lep.)
Chavarría Ch., M., 227 (Hel.)
Chedecal, M., with Gaud, 624 (Am.)
Cheek, E., with Lamprell, 753 (Haem.)
——, with Tasker & Whelan, 754 (Haem.)
Chen, T. H., 406 (Pl.)
——, with Walker, Foster, Larson & Meyer, 623 (Pl.)
Chesterman, C. C., 834 (Hel.)
Chichijo, K., with Komiya, Yokogawa, Nishimiya, Suguro & Yamaoka, 633, 1063 (Hel.)
Chieffi, G., with Molese, 319 (Hel.)
Chiga, M., with Greiff, Blumenthal & Pinkerton, 399 (Typh.)
Chimienti, N., (27) (Chl.)
Choremis, C., Zervos, N., Constantinides, B., Zannos, L. & Sklavounou, S., 241 (Haem.)
Chow, C. Y., 382 (Mal.)
——, Liang, K. C. & Pletsch, D. J., 475 (Mal.)
—— & Thevasagayam, E. S., 1092 (Ent.)
—— & Yue, T. F., 857 (Ent.)
Chowdhury, A. B., with Bhaduri, 834 (Hel.)
Chowdhury, S. R., 1012 (Mal.)
Christen A., R., with Atías M., 496 (Tryp.)
—— with Thiermann I., 495 (Tryp.)
Christensen, P. A. & Finney, D. J., (440) (Vms.)
Chung-Hoon, E. K., with Levine, Ichiriu, Arakaki & Beatty, 123 (Lep.)
Ciaccio, G., 397 (Typh.)
Cicchini, T., 626 (Am.), 1157 (Hel.)
—— with Benetazzo, 21 (Leish.)
Ciotola, A., 1105 (Reports, etc.)
Claessens, H., 17 (Tryp.)
Clark, E. W. & Ball, G. H., 385 (Mal.)
Clarke, C. A. & Sircus, W., 56 (Def. Dis.)
Clarke, D. H., 195, 196 (Mal.)
Clarke, G. H. V., 61 (Der.)
Clarke, V. de V., with Alves, 729 (Hel.)
Clausse, J., with Fabiani & Fulchiron, 482, 483 *bis* (Mal.)
Clavero, G., with Perez Gallardo & Hernandez, 924 (Typh.)
——, Perez Gallardo, F. & Valle, E., 923 (Typh.)
——, with —— & ——, 698 (Typh.)
Cleary, J. W., with Anspaugh & Rost, 757 (Haem.)
Cleland, W. S., with Stiles, (1174) (Ent.)
Cleve, E. A., with Freedman, 411 (Am.)
—— & Pruitt, F. W., 947 (Lep.)
Čmelik, S. & Briski, B., (960) (Hel.)
Coatney, G. R., with Greenberg, 484 (Mal.)
——, with Mercado, 679 (Mal.)
——, with Myatt, A. V., Hernandez, T., Jeffery, G. M. & Cooper, W. C., 85 (Mal.)
Coatney, G. R., with Richeson, Highman & Greenberg, 682 (Mal.)
Cochran, D. G., Grayson, J. M. & Levitan, M., (466) (Ent.)
Cochrane, R. G., 121, (125), 220, 520 (Lep.)
Coda, D., 794 (Mal.)
Cohen, S. S., with Wyatt, 209 (Typh.)
Colas, with Duroux, Jarniou & Celerier, (343) (Misc. Dis.)
Colbourne, M. J., 433 (Hel.)
Colcher, H., Drachman, S. R. & Adlersberg, D., 843 (Sp.)
Cole, B. A., Frick, L. P., Hodges, E. P. & Duxbury, R. E., 916 (Tryp.)
Cole, C. R., with Chamberlain & Docton, 652 (Prot.)
Coleman, N., with Eyles, 158, 568, 569, 980 (Prot.)
Colless, D. H., 183, 903 (Mal.)
Collier, W. A. & de la Parra, D. A., 144 (Haem.)
——, with Kletter & Winckel, 647 (Der.)
——, with Wildervanck & Winckel, 650 (Misc. Dis.)
Collignon, E. & Juillan, M., 998 (Mal.)
Collins, D. L., Travis, B. V. & Jamnback, H., 71 (Ent.)
Colonial Office, 169, 1102 (Reports, etc.), 388 (Tryp.), 457 (Ent.)
Colorado Iris, R. & Leyva, R. D., 316 (Lep.)
Combe, P. & Raffi, A., 1005 *bis* (Mal.)
Combes, F. C., with Orris, 42 (Hel.)
Conant, N. F., with Vogel, 62 (Der.)
Congo Belge, 172 (Reports, etc.)
Congo Belge: Fonds du Bien-Être Indigène, 76 (B.R.)
Conley, C. L., with Green & Berthong, 846 (Haem.)
——, with Smith, 1160 (Haem.)
Consoli, A., with Leonardi, 499 (Leish.)
Constantinides, B., with Choremis, Zervos, Zannos & Sklavounou, 241 (Haem.)
Contreras, F., Guillen, J., Torrella, E. & Alcaraz, M., 424 (Lep.)
Contreras, R., with Convit, Rassi & Canto Rodriguez, 421 (Lep.)
——, with Medina & Convit, 243 (Der.)
Convit, J., Gonzáles, C. L. & Rassi, E., 121 (Lep.)
——, with Medina & Contreras, 243 (Der.)
——, Rassi, E., Canto Rodriguez, F. & Contreras, R., 421 (Lep.)
Conway, H. & Berkeley, W., (559) (Der.)
Coonoor, 661 (Reports, etc.)
Cooper, W. C., with Coatney, Myatt, Hernandez & Jeffery, 85 (Mal.)
Cooray, G. H., with Michael, 215 (Am.)
Cope, V. Z., 355 (B.R.)
Copeland, B. E., with Sunderman, MacFate, MacFadyen & Stevenson, (965) (Haem.)
Copin, R., Jame, P. & Martin, J. R., 675 (Mal.)
Corcos, A. (905) (Mal.)
Corcos, M. G., 1142 (Lep.)
——, with Garrett, 125 (Lep.)
Cornet, R. J., 1185 (B.R.)
Corradetti, A., 22 (Leish.), 601 (Mal.)
—— & Cavaceppi, L., 91 (Mal.)
Corrêa, R. R. & Aguiar, A. A., (692) (Tryp.)
——, Lima, F. O. & Carvalho, P. J., 692 (Tryp.)
Cosar, C., 415 (Am.)
Costa, L., with de Lucena, 1128 (Tryp.)

Cottew, G. S., 852 (Misc. Dis.)
Couch, M. D., with Gilbert & McDuffie, 861 (Ent.)
Coudert, J. & Chastel, C., 678 (Mal.)
Courdurier, J., Bück, G. & Quesnel, J. J., 301 (Typh.)
——, with —— & ——, 602 (Mal.)
——, with Mercier & Lamberton, 621 (Rab.)
Couric, E. S., 337 (Vms.)
Courson, B., with Marcotorchino & Méar, (1079) (Ulc.)
Courtois, G., 305 (Pl.)
—— & Limbos, P., (344) (Misc. Dis.)
——, with Thys, Vanbreuseghem, Baker, Bertrand, de Muyncke, Limbos & Verselder, 444 (Der.)
Coutelen, F., Biguet, J., Doby, J. M. & Deblock, S., 44 (Hel.), 345, (1083) (Prot.)
——, ——, Obez, A. & Lefrançois, R., 140 (Hel.)
Coutinho, A. & Menezes, H., (650) (Misc. Dis.)
Coutinho, J. O., 319, 822 (Hel.)
——, Croce, J., Campos, R. & Amato Neto, V., 537, 828 (Hel.)
Coutinho, P. do P., Pinto, O. da S. & Barbosa, J. A., 694 (Tryp.)
Covell, G., 907, 910, 1118 (Mal.)
——, Russell, P. F. & Swellengrebel, N. H., 996 (Mal.)
——, Shute, P. G. & Maryon, M., 795, 1118 (Mal.)
Covello, A., with de Almeida & Pessoa, 1140 (Ys.)
Cowan, N. M., 955 (Hel.)
Crabbe, W. A., 998 (Mal.)
Crew, F. A. E., 1107 (B.R.)
Crewe, W., with Gordon, 747 (Hel.)
Crick, R. P., with Sorsby & Ungar, 1077 (Oph.)
Croce, J., with Coutinho, Campos & Amato Neto, 537, 828 (Hel.)
Croll, L. J., with Croll, 341 (Oph.)
Croll, M. & Croll, L. J., 341 (Oph.)
Cros, R., with Gallais, Cardaire, Planques, Pruvost & Nabholtz, 552 (Haem.)
Crosnier, Giraud, Darbon & Parvais, (600) (Mal.)
Crosnier, R. & Darbon, A., (413) (Am.)
Cross, L. C., with Etter, (636) (Hel.)
Crowther, A. F. & Levi, A. A., 485 (Mal.)
Cruickshank, J. C., 524 (Lep.)
Cuénod, A., 590 (B.R.)
Cummins, C. R., Bairstow, B. & Baker, L. A., 1074 (Der.)
Curbelo Hernández, A., González Prendes, M. A. & Fors Carbonell, A., 1052 (Lep.)
——, with —— & Pardo-Castelló, 1142 (Lep.)
Curd, F. H. S., with Ainley, Hepworth, Murray & Vasey, (395) (Tryp.)
——, with Barrett & Hepworth, (395) (Tryp.)
Curtis, A. C. & Harrell, E. R., Jr., 558 (Der.)
Cutler, J. C., with Portnoy & Galvez, 315 (Lep.)
Cvjetanović, B., Fališevac, J., Mihaljević, F., Kozmar, D., Topolnik, E., Vesenjak-Zmijanac, J., 1133 (Typh.)

D

Daglio, C. A., with Negroni, Briz de Negroni, Vivancos & Bonatti, 441 (Der.)
Dahm, P. A., with Burkhardt, 1091 (Ent.)
Dalmat, H. T., 658 (Ent.)
——, with Gibson, 235 (Hel.)
Dameshek, W., with Ludwin & Limentani, 145 (Haem.)
Darbon, with Crosnier, Giraud & Parvais, (600) (Mal.)
Darbon, A., with Crosnier, (413) (Am.)
Darrow, E. M., Gingrich, W. D. & Prine, J. H., 385 (Mal.)
Darwish, A. E., with Ghanem, (229) (Hel.)
Das, A., Ghosal, S. & Gupta, S. K., 811 (Chl.)
——, ——, Mondal, A. & Gupta, S. K., 810 (Chl.)
Das, A. K., with Sen Gupta, Bhattacharyya & Sanyal, 97 (Leish.)
Das Gupta, C. R., with Ghosh, 72 (Lab.)
Daugherty, J. W., 227 (Hel.)
Davenport, R. C. & Budden, F. H., 849 (Vms.)
Davey, D. G., with Robertson & Fairley, 186 (Mal.)
——, with Thomas & Robertson, 1120 (Mal.)
David, A., with Jaswant Singh, Ramakrishnan, Satya Prakash, Krishnaswami, Ray & Krishnan, 194 (Mal.)
Davidson, G., 190, 1011 (Mal.)
—— & Burnett, G. F., 191 (Mal.)
Davidson, W. S., 1145 (Lep.)
Davies, D. M., 255, 1097 (Ent.)
Davies, J. N. P., 452 (Misc. Dis.)
——, with Trowell, 141 (Def. Dis.)
——, with —— & Dean, 141 (Def. Dis.)
Davis, B. S., (801) (Tryp.)
Davis, D. L., with Thompson, Whipp & Batte, 1090 (Ent.)
Davis, G. E., 218, 219, 311 (R.F.)
Davison, A. R., 1141 (Lep.)
Dawood, M., with Halawani, Abdallah & Saif, 428 (Hel.)
Day, W. C., with Reagan & Brueckner, 404 (Rab.)
——, with ——, Moore, Kehne & Brueckner, 506 (Rab.)
Dayrit, C., Vargas, N. S. & Baltazar, A., 218 (Am.)
De, S. N., Bhattacharyya, K. & Raychaudhury, P. K., 214 (Chl.)
Dean, R. F. A., 141 (Def. Dis.)
—— & Schwartz, R., 550 (Def. Dis.)
——, with Trowell & Davies, 141 (Def. Dis.)
Deane, L. M. & Martins, R., 1029 (Tryp.)
——, with Rachou, 538 (Hel.)
Deblock, S., with Coutelen, Biguet & Doby, 44 (Hel.), 345, (1083) (Prot.)
Decour, H., with Gaud, 974 (Oph.)
DeCoursey, J. D. & Webster, A. P., 765 (Ent.)
Deegan, T., with Maegraith & Jones, 384 (Mal.)
Defrenne, P., 443 (Der.)
Dejou, L., 324 (Hel.)
Delahousse, J., 224 (Hel.)
DeLamater, J. N., with Hallman, 936 (Am.)
——, with Michaelson & Talpis, 1042 (Am.)
Delanoe, E., (246) (Oph.)
de la Parra, D. A., with Collier, 144 (Haem.)
Delfim, J., with Horta, (433) (Hel.)
del Pozo, E. C. & Gonzalez Ochoa, A., (122) (Lep.)
Delville, J. P., with Stijns, 756 (Haem.)
Demarchi, J., (1002) (Mal.)
Demarchi, M., with Jalili, 144 (Haem.)
——, with —— & Abdul-Rahman Abdul-Ghani, 60 (Haem.)
de Meillon, B., with Gerritsen, Walker & Yeo, 730 (Hel.)

de Meillon, B. & Hardy, F. (570) (Ent.)
——, with Kisner & Stoffberg, 733 (Hel.)
——, with Lurie, Stoffberg & Eiselen, 729 (Hel.)
——, Stoffberg, N. & Lurie, H. I., 631 (Hel.)
Deom, J., (290) (Tryp.)
Derrick, E. H., 616 (Typh.)
Desai, S. D., with Purandare, Bhende & Figueredo, 497 (Leish.)
Deschiens, R., (761) (Misc. Dis.)
——, Lamy, L. & Estival, J., 978 (Misc. Dis.)
—— & Mauzé, J., 760 (Misc. Dis.)
—— & Poirier, M., 764 (Prot.)
Desmonts, G., with Lelong, 64 (Prot.)
Devignat, R., 25 (Pl.)
Dewey, J. E., with Pimentel & Schwardt, 862 (Ent.)
Dharmendra & Chatterjee, K. R., 35 (Lep.)
—— & Chatterjee, S. N., (34), (1145) (Lep.)
——, —— & Sen, N., 34 (Lep.)
—— & Chatterji, S. N., 1145 (Lep.)
——, —— & Mukerjee, N., 721 (Lep.)
—— & Mukherjee, N., 314 (Lep.)
Diab, A. E. & Abu-Jaudeh, C. N., 447 (Oph.)
Diagne, A., Michel, L., Koite, P. & Veyret, D., 934 (Pl.)
Dias, C. B., 365 (B.R.)
Dias, E., 610, 691, 1127, 1128 (Tryp.), 825 (Hel.)
—— & Brant, T. C., 693 (Tryp.)
——, —— & Santos, R. M., 494 (Tryp.)
——, with Laranja, Duarte & Pellegrino, 610 (Tryp.)
—— & Pinto, O. da S., 495 (Tryp.)
——, ——, Pellegrino, J. & de Castro, J. A., 611 (Tryp.)
Dias, J. A. T. S., (260) (Ent.)
Díaz Nájera, A., with Vargas, (256) *bis*, 256, (351) (Ent.)
Dick, G. W. A. & Gee, F. L., 24 (Y.F.)
—— & Horgan, E. S., 403 (Y.F.)
Dicke, R. J., Moore, G. D. & Hilsenhoff, W. L., 258, (769) (Ent.)
Dickstein, B., (333) (Haem.)
Diercks, F. H., with Ley, Paterson, Smadel, Wisseman & Traub, 207 (Typh.)
——, with ——, Smadel & Paterson, 208 (Typh.)
——, with Smadel, Ley & Cameron, 207 (Typh.)
Diethelm, L. & Heuck, F., 738 (Hel.)
Diéz Rivas, F., Hernández Morales, F. & Koppisch, E., 239 (Sp.)
Dille, M., with Giboin, 1072 (Vms.)
Dillman, R. E., with Sexton & Eyles, 979 (Prot.)
Dinger, J. E., 74 (Reports, etc.)
Diouf, J., with Moulanier, 915 (Tryp.)
Di Primio, R., 802 (Tryp.)
Directorate of Colonial Surveys, 1022 (Tryp.)
Djourichitch, M., 919 (Typh.)
Doak, G. O., with Eagle, 686 (Tryp.)
Dobal, J. M., with Oliver-González, 939 (Am.)
Dobbin, J. E., Jr., with Barbosa, 1153, (1154) (Hel.)
——, with Edwards & Magalhães Neto, (1154) (Hel.)
Doby, J. M., with Coutelen, Biguet & Deblock, 44 (Hel.), 345, (1083) (Prot.)
Docton, F. L., with Chamberlain & Cole, 652 (Prot.)
Documenta Med. Geograph, et Trop., 74 (Reports, etc.)
Doflein, von F., 1109 (B.R.)
Dombrow, M., with Beckett, (45) (Hel.)
Donatien, A., with Parrot, 98 (Leish.)
——, Poul, J. & Rampon, R., (931), 1037 (Rab.)
Donoso I., A., Amenábar C., E., Zacarías G., A. & Rojas, G., 512 (Am.)
van Doormaal, T. A. J., 121 (Lep.)
van Doorn-Wittkampf, H. van W., with Bothwell, Du Preez & Alper, 964 (Def. Dis.)
Dorenlot, H., 722 (Lep.)
Doria-Medina, J., with Bevier & Torres-Muñoz, 926 (Y.F.)
Dorman, S. C. & Hall, W. E., (984) (Ent.)
Doss, H., with Gohar, El-Mofty, Eissa, Mousa, Sorour, Goma, Abou El-Wafa, El-Azhari, Mitri & Ibrahim, 305 (Chl.)
Dostrovsky, A., Sagher, F. & Zuckerman, A., 803 (Leish.)
Doucet, J., with Lepesme, 966 (Vms.)
Doull, J. A., Gray, H. H. & Bancroft, H., 946 (Lep.)
Dow, R. P., 1115 (Mal.)
Dowdell, W. F., Roth, H. P. & Shumway, N. P., 711 (Am.)
Dowling, M. A. C., 910 (Mal.)
Downs, W. G. & Arizmendi, A., 375 (Mal.)
——, with Bordas & Navarro, 376 (Mal.)
——, with Vargas, 252 (Ent.)
Dowsett, L. M. & Brown, A. E., 838 (Hel.)
Doyle, J. O., 1050 (Lep.)
Drachman, S. R., with Colcher & Adlersberg, 843, (Sp.)
Draper, C. C., 681, 790, 798 (Mal.)
Dreisbach, J. A., 126 (Lep.)
Dresden, D. & Oppenoorth, F. J., 464 (Ent.)
Dreyfuss, F., Ikin, E. W., Lehmann, H. & Mourant, A. E., 144 (Haem.)
Duarte, E., with Laranja, Dias & Pellegrino, 610 (Tryp.)
Dubey, V. D., 507 (Pl.)
Dubin, I. N., 284 (Mal.)
Dubois, A., 468 (Reports, etc.)
Dudani, A., Iyer, S. N., Krishna Murti, C. R. & Shrivastava, D. L., 510 (Chl.)
Duke, T. W., with Heyman & Patterson,(61) (Haem.)
Duman, L. J., with Weinstein, Trelawny & Patterson, 1062 (Hel.)
Dunlop, K. J. & Mozumder, U. K., 645 (Haem.)
Dunlop, S. J. C., 452 (Misc. Dis.)
Dupoux, R., with Schneider, 415 (Am.)
Du Preez, M. L., with Bothwell, van Doorn-Wittkampf & Alper, 964 (Def. Dis.)
Durand, J. B., with Levitan, Petrus & Jacobs, 517 (Ys.)
Durand-Delacre, R., with Parrot, (575) (Ent.)
Durieux, C., 660 *bis* (Reports, etc.)
Duroux, Jarniou, Colas & Celerier, (343) (Misc. Dis.)
Duxbury, R. E., with Cole, Frick & Hodges, 916 (Tryp.)
Dvořák, J., 982 (Prot.)
Van Dyke, J. G., with Gould & Gomberg, 642 (Hel.)
Dykes, J., Segesman, J. K. & Birsner, J. W., 557 (Der.)

E

Eagland, R. D., 752 (Haem.)
Eagle, H. & Doak, G. O., 686 (Tryp.)
East Africa High Commission, 45 (Hel.), 74, 171 (Reports, etc.), 389, 1018 (Tryp.), 999 (Mal.)
Eben, D. J., with Strandtmann, 919 (Typh.)
Eckhard, G., 905 (Mal.)
Eddy, G. W., 579 (Ent.)
Edelman, M. H., with Spingarn, 27 (Am.)
Edeson, J. F. B., with Field, Strahan & Wilson, 1120 (Mal.)
——, with Wilson, 380 (Mal.)
Edgar, S. A., Beye, H. K. & Mille, R., with Bambridge, B. & Lamarquand, 539 (Hel.)
——, with ——, ——, Kessel & Bambridge, 47 (Hel.)
Edgerton, W. H. & Burckhalter, J. H., (120) (Am.)
Edington, G. M. & Sarkies, J. W. R., 242 (Haem.)
Edmundson, W. F., Lopez Rico, A. & Olansky, S., 942 (Ys.)
Edney, E. B., (1100) (Ent.)
Edwards, D. G., with Jennings, (1176) (Ent.)
Edwards, G. A., Magalhães Neto, B. & Dobbin, J. E., Jr., (1154) (Hel.)
Egeberg, R. O., with Wier, Lack & Leiby, 62 (Der.)
Ehrhard, S., with Lemaire, Camain, Postel & Leduc, 968 (Vms.)
Eichenwald, H., with Sabin, Feldman & Jacobs, 567 (Prot.)
Eichler, W., 671 (Mal.). 774 (B.R.)
Eiselen, H. H., with Lurie, de Meillon & Stoffberg, 729 (Hel.)
Eisman, P. C., Geftic, S. G. & Mayer, R. L., 1149 (Lep.)
Eissa, A. A., with Gohar, El-Mofty, Mousa, Sorour, Doss, Goma, Abou El-Wafa, El-Azhari, Mitri & Ibrahim, 305 (Chl.)
Ejercito, A., 678 (Mal.)
Ekman, P., with Weiser & Spiotta, 1044 (Am.)
El-Azhari, A., with Gohar, El-Mofty, Eissa, Mousa, Sorour, Doss, Goma, Abou El-Wafa, Mitri & Ibrahim, 305 (Chl.)
El-Badry, A., 1046 (Am.)
El Din Sultan, G., with Gramiccia & Garrett Jones, 1009 (Mal.)
Eligh, G. S., 83 (Mal.)
——, with West, 160 (Ent.)
Elizondo, A., with Silva-Goytia, 500, 697 (Typh.)
El Karemi, M., with Mohammed, 555 (Vms.)
Ellenhorn, M. J. & Weiner, D., 336 (Haem.)
Ellis, F. P., 150 *bis* (Heat Str.)
——, with Adam, Irwin, Thomson & Weiner, 1163 (Heat Str.)
——, Smith, F. E. & Underwood, C. R., 1077 (Heat Str.)
El-Mofty, A., with Gohar, Eissa, Mousa, Sorour, Doss, Goma, Abou El-Wafa, El-Azhari, Mitri & Ibrahim, 305 (Chl.)
El-Saifi, M. F., with Mofty, (309) (Am.)
Elsdon-Dew, R., 538 (Hel.)
——, with Armstrong & Wilmot, 119 (Am.)
—— & Freedman, L., 112 (Am.)
—— & Maddison, S. E., 117 (Am.)
——, Roach, G. G. & Freedman, L., 417 (Am.)
Elson, B. E., with Winn, 104 (Typh.)
El Tamimi, M., with Nor El Din, 541 (Hel.)
Elton, N. W., (24), (107), 402 *bis* (Y.F.)
——, with Jutzy, Biber & Lowry, 554 (Vms.)
Elton, N. W., with Thornburgh & Johnson, 99 (Leish.)
Elyan, H. & Rimington, R. A., 553 (Haem.)
El Zahawi, S., 426 (Hel.)
Engelhardt, H., with Bingel, 104 (Typh.)
Englert, E., Jr. & Warshaw, L. J., 845 (Haem.)
Enigk, K. & Grittner, I., 466, 1175 (Ent.)
Eny, D. M. & Qualls, D. M., 32 (Ys.)
Erasmus, L. D., 344 (Misc. Dis.)
Ercoli, N. & Carminati, G. M., 418 (R.F.)
Estival, J., with Deschiens & Lamy, 978 (Misc. Dis.)
Etter, L. E. & Cross, L. C., (636) (Hel.)
Ettinger-Tulczynska, R., 624 (Am.)
Evans, A. S., with Stirewalt, 223, 533 (Hel.)
Evans, F. C. & Smith, F. E., 398 (Typh.)
Evans, J. W., 589 (B.R.)
Evens, F., with Neujean, 15 (Tryp.)
——, with Schoenaers & Neujean, 1023 (Tryp.)
Everritt, M. G., Sadun, E. H. & Carrera, G. M., 937 (Am.)
——, with —— & Krupp, 307 (Am.)
Exner, H., with Anschau, 459 (Ent.)
Eyles, D. E., 13, 199 (Mal.), 1080 (Prot.)
—— & Coleman, N., 158, 568, 569, 980 (Prot.)
——, Jones, F. E. & Smith, C. S., 1042 (Am.)
——, with Sexton & Dillman, 979 (Prot.)

F

Fabiani, G., Clausse, J. & Fulchiron, G., 482, 483 (Mal.)
—— & Fulchiron, G., 11 (Mal.)
——, —— & Clausse, J., 483 (Mal.)
—— & Grellet, P., 12 (Mal.)
——, ——, Vargues, R., Fulchiron, G. & Verain, A., (194) (Mal.)
—— & Izzo, M. A., 679, 680 (Mal.)
——, with Vargues, 680 (Mal.)
——, Vargues, R. & Fulchiron, G., 12 (Mal.)
——, ——, Grellet, P., Fulchiron, G. & Verain, A., 283 (Mal.)
—— & Vérain, A., 680 (Mal.)
Fagan, R., 212 (Rab.)
Faiguenbaum, A., J., 1159 (Hel.)
Fain, A., 39, 429, 639 (Hel.)
——, with Jadin & Rupp, 189 (Mal.)
—— & Lagrange, E., 40 (Hel.)
Fairley, N. H., 83, 85, 910 (Mal.), 329 (Sp.), 834 (Hel.)
——, with Robertson & Davey, 186 (Mal.)
Falcone, G., 185 (Mal.), 559, 1163 (Oph.)
Fales, J. H., Bodenstein, O. F. & Piquett, P. G., 167 (Ent.)
Fališevac, J., with Cvjetanović, Mihaljević, Kozmar, Topolnik & Vesenjak-Zmijanac, 1133 (Typh.)
Falkinburg, L. W., (62) (Der.)
De Faria, J. L., 1053 (Lep.)
Farina, R., (1056) (Lep.)
Fariñas, P., 1147 (Lep.)
Farinaud, E., with Canet, 278 (Mal.)
Farrar, M. D. & Brannon, C. C., 864 (Ent.)
Faucheux, R., with Giroud, Boidé & Humann, 502 (Typh.)
Faure, (102) (Typh.)
Faust, E. C., with Carrera & Sadun, 309 (Am.)
Favez, G., 301 (Typh.)

Feigenbaum, A., 446 (Oph.)
Feldman, H. A., 1080 (Prot.)
——, with Kass, Andrus, Adams, & Turner, 157 (Prot.)
——, with Miller, 979 (Prot.)
——, with Sabin, Eichenwald & Jacobs, 567 (Prot.)
Feldman-Muhsam, B., 659 *bis* (Ent.)
Fendall, N. R. E., 496 (Leish.)
Fernández, J. M. M., 1148 (Lep.)
—— & Carboni, E., 36 (Lep.)
Ferrada Urzúa, L., with Niño, 442 (Der.)
Ferrand, G. & Soyer, R., 974 (Oph.)
Ferraz, D. M., with Ferreira, 538, 1159, (Hel.)
——, with Rachou, 159 (Ent.)
Ferraz, N. de T., with Souza & Bechelli, 1055 (Lep.)
Ferreira, F. S. da C. & de Almeida, C. L., 737 (Hel.)
Ferreira, J. M. & Meira, J. A., (320) (Hel.)
Ferreira, M. de O. & Ferraz, D. M., 538, 1159 (Hel.)
Ferrini, O., with Arcuri, 315 (Lep.)
Ferro-Luzzi, G. & Salzmann, S., 548 (Def. Dis.)
Fidler, H. K., 499 (Leish.)
Field, J. W., Strahan, J. H., Edeson, J. F. B. & Wilson, T., 1120 (Mal.)
de Figueirêdo, A., 541 (Hel.)
Figueredo, N., with Purandare, Bhende & Desai, 497 (Leish.)
Filer, M. K., with Baranger, 684 (Mal.)
Findlay, G. M., with Ampofo, 248 (Ulc.)
Fink, J. C., VanderPloeg, D. E. & Moursund, M. P., 758 (Der.)
Finney, D. J., with Christensen, (440) (Vms.)
Fischer, L., 941 (R.F.)
Fischl, M., 711 (Am.)
Fisher, B., with Singer, 335, 551, 1160 (Haem.)
Fisher, R. W., 69 (Ent.)
Fisk, F. W., with Lockard, 865 (Ent.)
Fisken, R. A., with Weston, Thompson, Reinertson & Reutner, (641) (Hel.)
Floch, H., 9 (Mal.), (211) (Y.F), 513 (Am.), 582 (Reports, etc.), 646, 757 (Haem.)
—— & Horth, R., 819 (Lep.)
—— & Lecuiller, A., 221 (Lep.)
——, —— & Sureau, P., 221, 316, 424 (Lep.)
——, with Le Gac & Chassignet, (256) (Ent.)
—— & Sohier, R., 422 (Lep.)
—— & Sureau, P., 35, 222, 424 (Lep.), 1032 (Leish.)
Florio, L., Miller, M. S. & Mugrage, E. R., 403 (Den.)
da Fonseca, F. & Aragão, H., (579) *bis* (Ent.)
——, with —— (579) (Ent.)
da Fonseca, J. A. B., Passalacqua, C. S. P., de Lima, A. R., de Oliveira, A. P. & Lacerda, J. H. de M., (692) (Tryp.)
Fonte, J., with Risi & Rossas, 723 (Lep.)
Fonzari, M., 757, 758 (Der.)
Foote, R. H., with Sommerman, 858 (Ent.), 1116 (Mal.)
Fors Carbonell, A., with Curbelo Hernández & González Prendes, 1052 (Lep.)
——, with Gonzales Prendes, Pardo-Castelló & Curbelo Hernandez, 1142 (Lep.)
Foster, G. E., Kendrick, E. L., Walton, E. & Williams, W. D. (34) (Lep.)
Foster, L. E., with Walker, Chen, Larson & Meyer, 623 (Pl.)
Foulk, R., with Love, Williams & Mitchell, 378 (Mal.)
Fountaine, J., with Goodman & Vincent, 1075 (Der.)
Fournier, J., 1104 (Reports, etc.)
Fox, I., (656), 865 (Ent.)
Foy, H., Kondi, A., Rebello, A. & Martins, F., 61 (Haem.)
Fradkin, R., with Schmidt, Genther, Helm & Weiland, 480 (Mal.)
Franca, M. E., with Talice, Veríssimo & Osimani, 490 (Tryp.)
da França, O. H., 526 (Hel.)
Francis, J., 425 (Lep.)
Franco, A., with Pinto & Parreira, 800 (Tryp.)
——, with Trincão, Gouveia & Parreira, 646 (Haem.), 685 (Tryp.)
——, with Trincão, Parreira & Gouveia, 93, 686 (Tryp.)
Frank, A. & Paul, K., 230 (Hel.)
Frankl, O., 1154 (Hel.)
Frazer, A. C., 329 (Sp.)
Fredeen, F. J. H., Arnason, A. P. & Berck, B., 769 (Ent.)
——, Spinks, J. W. T., Anderson, J. R., Arnason, A. P. & Rempel, J. G., 575 (Ent.)
Fredrickson, L. E., Willett, J. C., Smith, J. E. & Price, E. R., 704 (Rab.)
Freedman, L., 580 (Lab.)
——, with Elsdon-Dew, 112 (Am.)
——, with —— & Roach, 417 (Am.)
Freedman, M. J. & Cleve, E. A., 411 (Am.)
Freedman, M. L., with Laufer, 478 (Mal.)
Freedman, T., with Sloan, 938 (Am.)
Freer, P. M., 746 (Hel.)
de Freitas, J. L. P., with Pessôa, 396 (Tryp.)
French, A. J. & Russell, S. R., (648) (Der.)
Frenkel, J. K., 1080 (Prot.)
Freudenthal, M. L., with Alkan & Steinitz, 343 (Misc. Dis.)
Frey, W., 357 (B.R.)
Freytag, R. E., with Hunter & Ritchie, 321 (Hel.)
——, with ——, ——, Pan, Yokogawa & Potts, 129 (Hel.)
Frick, L. P., with Cole, Hodges & Duxbury, 916 (Tryp.)
Friedmann, M., 902 (Mal.)
Frings, H., with Knipe, (657), 861 (Ent.)
Frith, G. R. with Travis, Applewhite & Goldsmith, 860 (Ent.)
Fritz, R. F. & Andrews, J. M., 902 (Mal.)
Frizzi, G., 597, 1004 (Mal.)
Froggatt, T., 486 (Tryp.)
Fros, J. & Liqui Lung, M. A. V., 1158 (Hel.)
—— & Winckel, W. E. F., 434 (Hel.)
——, with ——, 435 (Hel.)
Frumusan, P., with Cattan & Lumbroso, (1156) (Hel.)
Frye, W. W., with Martin, Garfinkel, Brooke & Weinstein, 710 (Am.)
Fu, H. H. & Ma, K. C., 734 (Hel.)
Fuhrmann, G., 277 (Mal.)
—— & Koenig, K., 813 (Am.)
Fujii, S., with Omori, 1171 (Ent.)
Fulchiron, G., with Fabiani, 11 (Mal.)
——, with —— & Clausse, 482, 483 *bis* (Mal.)
——, with ——, Grellet, Vargues & Verain, (194) (Mal.)
——, with —— & Vargues, 12 (Mal.)

Fulchiron, G., with Fabiani, Grellet & Verain, 283 (Mal.)
Fuller, H. S., with Wharton, 983 (Ent.)
Fulton, J. D. & Rimington, C., 1015 (Mal.)
—— & Spooner, D. F. (309) (Am.)
Fulton, R. A. & Gelardo, R. P., 772 (Ent.)
Furtado, T. A., 1162 (Der.)
Fusaroli, A., 802 (Leish.)

G

Gaase, A., 55 (Hel.)
Gadgil, R. K. & Shah, S. N., 317 (Hel.)
Gaillard, J., with Giroud & Roger, 921 (Typh.)
Gaillard, J. A., with Giroud, 396, 618 (Typh.)
——, with Giroud & Le Gac, 65 (Prot.)
——, with ——, —— & Jadin, 297 (Typh.)
Gajardo Tobar, R., 491 (Tryp.)
Galal, O., 225 (Hel.)
Galea, M., with Chambon, 506 *bis* (Rab.)
Galindo, P., with Carpenter & Trapido, 211 (Y.F.)
Gall, D., with Kitchen, 1168 (Ent.)
Gallais, P., 334 (Haem.)
—— & Badier, M., 488 (Tryp.)
——, Cardaire, G., Planques, L., Pruvost, A., Cros, R. & Nabholtz, M., 552 (Haem.)
Galliard, H., 19 (Tryp.), 324 (Hel.)
—— & Chabaud, A. G., 827 (Hel.)
Gallut, J., 704 *bis* (Chl.)
Galvão, A. B., (570) (Ent.)
Galvez, R. with Portnoy & Cutler, 315 (Lep.)
Gambardella, A., (309) (Am.)
—— & Tecce, N., 1132 (Typh.)
Gandhi Memorial Leprosy Foundation, Wardha, 521 *bis* (Lep.)
Ganguli, N., with Adhikari, 676 (Mal.)
Ganzin, M., Rebeyrotte, P., Macheboeuf, M. & Montezin, G., 93 (Tryp.)
Gapinski, L., with Zaiman & Omi, 963 (Hel.)
Garber, E. D., Noble, K. & Carouso, N., 933 (Pl.)
García, E., 926 (Y.F.)
Garcia, M. F., De Mattos, A. & Bürger, H., 960 (Hel.)
Garcia-Lopez, G., with Spies, Stone, Suarez, Lopez-Toca & Reboredo, 755 (Haem.)
García Sanz, J. A., with Gómez Orbaneja, 124 (Lep.)
García Solórzano, E., 925 (Y.F.)
Garfinkel, B. T., with Martin, Brooke, Weinstein & Frye, 710 (Am.)
——, with Weinstein & Miller, 309 (Am.)
Garin, J. P., 616 (Typh.), 981 *bis* (Prot.)
Garland, H. G. & Phillips, W., 1107 (B.R.)
Garnham, P. C. C., with Bray, 1121 (Mal.)
——, with Heisch, 1028 (Tryp.)
—— & Pick, F., 285 (Mal.)
Garrett, A. S. & Corcos, M. G., 125 (Lep.)
Garrett Jones, C., with Gramiccia & El Din Sultan, 1009 (Mal.)
Garrido-Lecca, G. & Tola, A., 930 (Rab.)
Gasalla Chacón, J. M., with Lallemand Carpio, (635) (Hel.)
Gast Galvis, A., 805 (Y.F.)
Gatti, J. C. & Cardama, J. E., 423 (Lep.)
Gaud, J., 527 (Hel.)
—— & Chedecal, M., 624 (Am.)
—— & Decour, H., 974 (Oph.)
de Gavallér, B., 455 (Prot.)
Gee, F. L., with Dick, 24 (Y.F.)
Gefel, A. & Rubenow, R., 1048 (R.F.)
Geftic, S. G., with Eisman & Mayer, 1149 (Lep.)
Geigy, R. & Huber, M., 199 (Tryp.)
—— & Kraus, C. (260) (Ent.)
Geiman, Q. M., with Hsu, 90 (Mal.)
Gelardo, R. P., with Fulton, 772 (Ent.)
Gelfand, M., 1111 (B.R.)
—— & Alves, W. D., 530 (Hel.)
——, with ——, 128 (Hel.)
—— & Berney, B., 1036 (Typh.)
—— & Honey, R. M., 731 (Hel.)
Gelfand, M. & Ross, W. F., 956 *bis* (Hel.)
Gemar, F., with Ross, 1143 (Lep.)
Genther, C. S., with Schmidt, Fradkin, Helm & Weiland, 480 (Mal.)
Georgopoulos, G., with Lividas, 1007 (Mal.)
Gerloff, R. K., with Burke & Salvin, 339 (Der.)
Gernez-Rieux, C., Montestruc, E. & Tacquet, A., 33, 315 (Lep.)
Gerritsen, T. & Walker, A. R. P., 868 (Reports, etc.)
——, ——, de Meillon, B. & Yeo, R. M., 730 (Hel.)
Gersdorff, W. A. & Mitlin, N., 352 (Ent.)
——, Nelson, R. H. & Mitlin, N., 574 (Ent.)
Ghanem, M. H. & Darwish, A. E. (229) (Hel.)
Ghani, A. R. & Hamid, A., (80) (Mal.)
Ghelelovitch, S., with Roubaud, 801 (Tryp.)
Ghéstin, F., with Canet, 118 (Am.)
Ghosal, S., with Das & Gupta, 811 (Chl.)
——, with ——, Mondal & Gupta, 810 (Chl.)
Ghosal, S. C., with Chaudhuri, Mondal & Chakravarty, 810 (Chl.)
—— & Paul, B. M., 511 (Chl.)
Ghosh, S. K. & Das Gupta, C. R., 72 (Lab.)
Giboin, L. M. & Dille, M., 1072 (Vms.)
Gibson, C. L. & Burch, T. A., 639 (Hel.)
—— & Dalmat, H. T., 235 (Hel.)
Gilbert, D. J., 723 (Lep.)
Gilbert, I. H., Couch, M. D. & McDuffie, W. C., 861 (Ent.)
Gil Collado, J., 14 (Tryp.), 570 (Ent.)
Gill, A. J. & Smith, A. L., 55 (Hel.)
Gill, E. R., with Hewitt, Wallace, Gumble & Williams, 690 (Tryp.)
——, with ——, —— & Williams, 91 (Mal.)
Gillanders, A. D., 141 (Def. Dis.)
Gilles, C. W. & Singer, I., (602) (Mal.)
Gillespie, J. O., with Wurl & Beisel, 87 (Mal.)
Gillies, M. T., 903 (Mal.)
Gilmour, C. C. B., 509 (Chl.)
Gilroy, A. B., 187, 1000 (Mal.)
Gindy, M. S., 1156 (Hel.)
Gingrich, W. D., with Darrow & Prine, 385 (Mal.)
van Ginkel, J. H. R., 563 (Misc. Dis.)
Girard, G., 111 (Pl.)
Giraud, with Crosnier, Darbon & Parvais, (600) (Mal.)
Giraud, P., with Linhard, Busson & Guyonnet, 840 (Def. Dis.)
Girgis, B., 38 (Hel.)
Girolami, M., 353 (Reports, etc.)
Giroud, P., Boidé, D., Humann, H. & Faucheux, R., 502 (Typh.)
——, Gaillard, J. & Roger, F., 921 (Typh.)
—— & Gaillard, J. A., 396, 618 (Typh.)
—— & Goulon, M., 300 (Typh.)

Giroud, P., Le Gac, P. & Gaillard, J. A., 65 (Prot.)
——, ——, Jadin, J. & Gaillard, J. A., 297 (Typh.)
——, —— & Le Hénaff, A., 101 (Typh.)
——, with —— & Lemaigre, 295 (Typh.)
Giudicelli, P., with Charmot & le Henand, 941 (R.F.), 1045 (Am.)
Gjullin, C. M., Isaak, L. W. & Smith, G. F., 1087 (Ent.)
——, Lindquist, A. W. & Butts, J. S., 253 (Ent.)
——, with Stage & Yates, 655 (Ent.)
Glasgow, J. P. & Wilson, F., 915 (Tryp.)
Gleim, F., with Weigand, 1167 (Prot.)
Glenn, S., with Manwell, 685 (Mal.)
Goble, F. C., 20 (Tryp.)
Gohar, M. A., El-Mofty, A., Eissa, A. A., Mousa, A. H., Sorour, A., Doss, H., Goma, T., Abou El-Wafa, M., El-Azhari, A., Mitri, S. & Ibrahim, M., 305 (Chl.).
Goldsmith, J. B., with Travis, Applewhite & Frith, 860 (Ent.)
Golem, S. B. & Özsan, K., 110 (Pl.)
Goma, T., with Gohar, El-Mofty, Eissa, Mousa Sorour, Doss, Abou El-Wafa, El-Azhari, Mitri & Ibrahim, 305 (Chl.)
Gomberg, H. J., 749 (Hel.)
——, with Gould & Van Dyke, 642 (Hel.)
Gomer, J., with Jonchère & Reynaud, 1024 (Tryp.)
Gomes, F., with Tendeiro & Pinto, 815 (Am.)
Gomes, J. M., 1051 (Lep.)
Gómez Orbaneja, J. & García Sanz, J. A., 124 (Lep.)
Gondard, L., 626 (Am.)
Gönnert, R., with Altmann, 1061 (Hel.)
Gonzáles, C. L., with Convit & Rassi, 121 (Lep.)
González, O., with Jarpa, Martini & Saavedra, (534) (Hel.)
González-Ciapessoni, A., with Talice, 70 (Ent.)
González Ochoa, A., with del Pozo, (122) (Lep.)
——, Martínez Báez, M., Lavalle Aguilar, P. & Castro Estrada, S., 220 (Lep.)
González Prendes, M. A., with Curbelo Hernández & Fors Carbonell, 1052 (Lep.)
——, Fors Carbonell, A., Pardo-Castelló, V. & Curbelo Hernandez, A., 1142 (Lep.)
——, with Ibarra Pérez, 1051 (Lep.)
—— & Ybarra Pérez, R., 1050 (Lep.)
González Rivera, M., with Varela & Barriga Vázquez, 517, 720 (Ys.)
Goodman, J. R., Fountaine, J. & Vincent, J., 1075 (Der.)
Goodman, M. & Campbell, D. H., 846 (Haem.)
Goodner, K., with McCrumb, Mercier, Robic, Bouillat, Smadel & Woodward, 933 (Pl.)
Goodwin, L. G., 85, 377 (Mal.)
—— & Chandler, R. L., (201) (Tryp.)
—— & Unsworth, K., (201) (Tryp.)
Goodwin, M. H., Jr., with Love & Wilkin, 684 (Mal.)
—— & Stapleton, T. K., 13 (Mal.)
Goodwin, W. J. & Schwardt, H. H., 863 (Ent.)
Gordin, R., with von Bonsdorff, 44 (Hel.), 553 (Haem.)
Gordon, R. M. & Crewe, W., 747 (Hel.)
——, with Griffiths, 460 (Ent.)
Gorgas Memorial Institute, 984 (Reports, etc.)
Gould, S. E., 749 (Hel.)
——, van Dyke, J. G. & Gomberg, H. J., 642 (Hel.)
Goulding, R., Robson, J. M. & Rees, R. J. W., 524 (Lep.)
Goulon, M., with Giroud, 300 (Typh.)
Gouveia, E., with Trincão, Franco & Parreira, 646 (Haem.), 685 (Tryp.)
——, with ——, Parreira & Franco, 93, 686 (Tryp.)
Govaert, J., (1063) (Hel.)
Govindan, K. K. & Radhakrishna Rao, M. V., 964 (Def. Dis.)
Grace, H. K. & Aidaros, S. M., 38 (Hel.)
Gramiccia, G., Garrett Jones, C. & El Din Sultan, G., 1009 (Mal.)
Gray, C. T., 37 (Lep.)
Gray, H. E., 573 (Ent.)
Gray, H. H. & Bancroft, H., 946 (Lep.)
——, with Doull & Bancroft, 946 (Lep.)
Gray, J. A. C., 629 (Lep.)
Gray, P., 1113 (B.R.)
Grayson, J. M., with Cochran & Levitan, (466) (Ent.)
Greany, W. H., 528, 726 (Hel.)
Green, T. W., Conley, C. L. & Berthong, M., 846 (Haem.)
Greenberg, H., with Incho, 352 (Ent.)
Greenberg, J., 1122 (Mal.)
—— & Coatney, G. R., 484 (Mal.)
——, with Richeson, Highman & Coatney, 682 (Mal.)
Greenberg, M., with Appelbaum & Nelson, 404 (Rab.)
Greiff, D., Chiga, M., Blumenthal, H. T. & Pinkerton, H., 399 (Typh.)
Grellet, P., with Fabiani, 12 (Mal.)
——, with ——, Vargues, Fulchiron & Verain, (194), 283 (Mal.)
Gremliza, L., 930 (Rab.), 1058 (Hel.)
Griffiths, R. B. & Gordon, R. M., 460 (Ent.)
Griffiths, S. B., (552) (Haem.)
Grignaschi, V. J., 1016 (Mal.)
Grittner, I., with Enigk, 466, 1175 (Ent.)
Grjebine, A., 374 (Mal.)
Grocott, R. G., with Caballero y C., 1071 (Hel.)
Groot, H., 203 (Tryp.)
Gross, B., with Bonnet, 1038 (Pl.)
Groves, H. F., with Koutz, (537) (Hel.)
Grulee, C. G., Jr., with Humphries, 347 (Prot.)
Grunberg, E. & Titsworth, E. H., 724 (Lep.)
Grundmann, A. W., Butler, J. M. & Selin, M. J., (1157) (Hel.)
Guadagnini, M., 1145 (Lep.)
Gubar', V. V., with Petrishcheva, 694 (Leish.)
Guedes, A. da S., with Pinto & Bicalho, 491 (Tryp.)
Guelmino, D. & Jevtić, M., 331 (Haem.)
Güemes R., M., (132) (Hel.)
Guggenheim, K. & Shamir-Zernik, R., (792) (Mal.)
Guggisberg, C. A. W., with Heisch, 465, 466, (772) (Ent.), 803 (Leish.)
Guha, P. C., with Raman & Raghavan, 1017 (Mal.)
——, with Srinivas & Guha, (378) (Mal.)
Guha, S. S., with Srinivas & Guha, (378) (Mal.)
Guichard, A., with Béquignon & Vialat, 1134 (Rab.)
Guicherit, I., with Blumberg & McGiff, 1067 (Hel.)
Guillen, J., with Contreras, Torrella & Alcaraz, 424 (Lep.)
Guillon, P., 641 (Hel.)

Guimarães, F. N., 628 (Ys.), 695 *bis* (Leish.)
Gumble, A. R., with Hewitt, Wallace, Gill & Williams, 690 (Tryp.)
Gunther, C. E. M., (206) (Typh.), 793 (Mal.)
—— & Bruce, H. B., 285 (Bl.)
—— & Wright, W. G., 908 (Mal.)
Gupta, B. M., with Misra & Hameed, 854 (Misc. Dis.)
Gupta, N. P., Mehrotra, T. N., Mangalik, V. S. & Chandy, P. J., 629 (Lep.)
Gupta, S. K., with Das & Ghosal, 811 (Chl.)
——, with ——, —— & Mondal, 810 (Chl.)
Gurevitch, J., with Bachrach, Landau & Birnbaum, 559 (Oph.)
——, with Landau & Bachrach, 1142 (Lep.)
—— & Laufer, A., 277 (Mal.)
Gurr, G. T., 169 (Lab.)
Gusmão, J. B., with De Bustamante, 1129 (Tryp.)
Gustina, F. J., with Bumbalo & Oleksiak, 838 (Hel.)
Gutiérrez, J., with Neghme & Albi, 927 (Y.F.)
Gutierrez Villegas, L., with Kahn, 147 (Der.)
Gutzevich, A. V., 627 (R.F.)
Guyonnet, C., with Linhard, Busson & Giraud, 840 (Def. Dis.)

H

Haas, G., (554) (Vms.)
Hack, W. H., (1174) (Ent.)
Hackett, C. J., 775, 944, 1049 (Ys.)
Hadaway, A. B. & Barlow, F., 165, 167, 1085 (Ent.)
Haddow, A. J., 106 (Y.F.), 585 (Reports, etc.)
——, with Ross, Raper & Trowell, 618 (Y.F.)
Hadidian, Z., 440 (Vms.)
Hadji, A., with Remlinger & Bailly, 1037 (Rab.)
Hadjinicolaou, J. & Hansens, E. J., 863 (Ent.)
Hadler, W. A., Carvalho, C. M. & Mauri, A. C., 425 (Lep.)
Hahn, R. G. & Bugher, J. C., 807 (Y.F.)
Halawani, A., Abdallah, A., Dawood, M. & Saif, M., 428 (Hel.)
Halcrow, J. G., 903 (Mal.)
Hale, T. R. & Halpenny, G. W., 906 (Mal.)
Hale, W. M., with Stoner, 56 (Hel.)
Hales, D. R. & Welch, A. D., 630 (Hel.)
Hall, W. E., with Dorman, (984) (Ent.)
Hall, W. J., 457 (Ent.)
Hallman, F. A. & DeLamater, J. N., 936 (Am.)
Halpenny, G. W., with Hale, 906 (Mal.)
Halstead, B. W. & Bunker, N. C., 556 (Vms.)
Hamazaki, Y., 422 (Lep.)
Hambleton, E. J., 570 (Ent.)
Hameed, S., with Misra & Gupta, 854 (Misc. Dis.)
Hamelin, A., with Levaditi & Vaisman, 219 *bis*, 310 (R.F.)
——, with Vaisman & Levaditi, 941 (R.F.)
Hamid, A., 911 (Mal.)
——, with Ghani, (80) (Mal.)
Hamilton, L., 85 (Mal.)
Hammouda, M. & Sidky, M., 57 (Def. Dis.)
Hamperl, H., 456 (Prot.)
Hampton, U. M., 257 (Ent.)
Hanchett, L. J., with Norris, Schneider, Kohler & Buren, 1135 (Pl.)
Handbuch der Inneren Medizin, 357 (B.R.)
Hanks, J. H. & Backerman, T., 426 (Lep.)
Hansens, E. J., 863 (Ent.)
—— & Bartley, C. E., 864 (Ent.)
——, with Hadjinicolaou, 863 (Ent.)
Hardy, F., with de Meillon, (570) (Ent.)
Haron, T., 918 (Tryp.)
Harrell, E. R., Jr., with Curtis, 558 (Der.)
Harrell, G. T., with Aikawa & Brooks, 922 (Typh.)
——, with Rosenblum & Masland, 103 (Typh.)
Harries, C. V., (1132) (Typh.)
Harris, B. P., (208), (616) (Typh.)
Harrison, C. M., 1092 (Ent.)
Harrison, F. G. & Harrison, F. G., Jr., 847 (Haem.)
Harrison, F. G., Jr., with Harrison, 847 (Haem.)
Harrison, J. L., (1033) (Typh.)
—— & Lim, B. L., 1033 (Typh.)
—— & Traub, R., 1033 (Typh.)
Harrison, R. A., 161, 162 (Ent.)
——, with Satchell, 718 (Ys.)
——, with Smith, 161 (Ent.)
Hartney, J. B., with Perez-Pina & Zimmerman, (377) (Mal.)
Harvey, A. E. C., with Heisch, (772) (Ent.), 815 (R.F.)
Harvey, D. & Titman, W. L., 643 (Def. Dis.)
Harwood, P. D., 952 (Hel.)
Harwood, R. F., with Brennan, 1170 (Ent.)
Haseeb, M. A., 213 (Rab.)
Hashimoto, N., with Shinozaki, 537 (Hel.)
Haskins, W. T., with Newton, 1061 (Hel.)
Hasselmann, C. M., 31, (719) (Ys.)
Hassett, C C. & Jenkins, D. W., (66) (Ent.)
Haswell, M. R., 1102 (Reports, etc.)
Hattori, T., with Yoshie, Takeda & Koshiro, 819 (Lep.)
Havlík, O., 762 (Prot.)
Hawking, F., 743 (Hel.), 1122 (Mal.)
——, with McGregor & Smith, 232 (Hel.)
Hawkins, W. B., with Kruse' & Ludvik, 87, 383 (Mal.)
Hayashi, S., with Sasa, Kano, Sato, Komine & Ishii, 741 (Hel.)
Hayes, R. O., 1171 (Ent.)
Haymaker, W., with Noad, 920 (Typh.)
Hayne, I., with Young, 327 (Hel.)
Heal, R. E., with Rogers, Brown & Rasmussen, (984) (Ent.)
Hedeen, R. A., with Applewhite & Keegan, 1084 (Ent.)
Heffernon, G. A., Hittner, H. J. & Kocis, S. L., 450 (Heat Str.)
Heilig, R., 132 (Hel.)
Heisch, R. B., 30, 311 (R.F.), 110 (Pl.), (772) (Ent.)
—— & Garnham, P. C. C., 1028 (Tryp.)
—— & Guggisberg, C. A. W., 465, 466, (772) (Ent.), 803 (Leish.)
—— & Harvey, A. E. C., (772) (Ent.), 815 (R.F.)
Heller, H., 1058 (Hel.)
Hellmeister, O. & Pereira, M. B., 821 (Hel.)
——, with Villela, 814 *bis* (Am.)
Helm, H., with Schmidt, Genther, Fradkin & Weiland, 480 (Mal.)
Helweg-Larsen, P., Hoffmeyer, H., Kieler, J., Thaysen, E. H., Thaysen, J. H., Thygesen, P. & Wulff, M. H., 547 (Def. Dis.)
Hems, R., with Johnson, Kaye & Krebs, (966) (Vms.)
Henderson, J. M., 274 (Mal.)
Hendricks, J. R., with Olivier & Vaughn, 39 (Hel.)

Henmi, M., with Takemori & Kitaoka, 614 (Typh.)
Henrard, C., 487 (Tryp.)
Henry, A. F. X., 1030 (Leish.)
Hepworth, W., with Ainley, Curd, Murray & Vasey, (395) (Tryp.)
——, with Barrett & Curd, (395) (Tryp.)
Herbig-Sandreuter, A., 682 (Mal.)
Herms, H. P., 462 (Ent.)
Hernandez, S., with Perez Gallardo & Clavero, 924 (Typh.)
Hernandez, T., with Coatney, Myatt, Jeffery & Cooper, 85 (Mal.)
Hernández Morales, F., with Diéz Rivas & Koppisch, 239 (Sp.)
Hertzberg, R., 157 (Prot.)
Herzberg, K., Herzberg-Kremmer, H. & May, G., 456 (Prot.)
Herzberg-Kremmer, H., with Herzberg & May, 456 (Prot.)
Hess, A. D. (660) (Ent.)
Heuck, F., with Diethelm, 738 (Hel.)
Heuls, J., with Beye, Kessel, Thooris & Bambridge, 738 (Hel.)
Hewitt, R. I., Wallace, W. S., Gill, E. R. & Williams, J. H., 91 (Mal.)
——, ——, Gumble, A. R., Gill, E. R. & Williams, J. H., 690 (Tryp.)
Heyman, A., Patterson, J. L., Jr. & Duke, T. W., (61) (Haem.)
Higginson, J., 761 (Misc. Dis.)
Highman, B., with Richeson, Greenberg & Coatney, 682 (Mal.)
Hightower, J. A. & Bauman, P. M., 39 (Hel.)
Hill, K. R., 562 (Misc. Dis.)
——, Rhodes, K., Stafford, J. L. & Aub, R., 329 (Def. Dis.)
Hill, R. B. (161) (Ent.)
Hilsenhoff, W. L., with Dicke & Moore, 258, (769) (Ent.)
Himpe, N. E. & Pierquin, L., 9 (Mal.)
Himsworth, H. P., 169 (Reports, etc.)
Hinchliffe, M. C., with Stunkard, 42, 1062 (Hel.)
Hine, S., with Tanimura, 655 (Ent.)
Hirschlerowa, Z. & Kozar, Z., 565 (Prot.)
Hirst, L. F., 1179 (B.R.)
Hitchings, G. H., 85 (Mal.)
——, Maggiolo, A., Russell, P. B., VanderWerff, H. & Rollo, I. M., (87) (Mal.)
Hittner, H. J., with Heffernon & Kocis, 450 (Heat Str.)
Hoare, C. A., 564 (Prot.), 625 (Am.)
Hocking, B., 68, 160 (Ent.)
Hodges, E. P., with Cole, Frick & Duxbury, 916 (Tryp.)
Hoekenga, M. T., 627 (Am.)
Hoenig, W. & Mohr, W., 262 (Reports, etc.)
Hoeppli, R., 867 (Reports, etc.)
—— & Wu, C., 662 (Reports, etc.)
Hoffman, D. O. & Zakhary, R., 733 (Hel.)
Hoffman, R., with Schmidt, Hughes, Schmidt, Ackermann, Moore & Weiland, 481 (Mal.)
Hoffman, R. A., with Roth, 573 (Ent.)
Hoffmeyer, H., with Helweg-Larsen, Kieler, Thaysen, Thaysen, Thygesen & Wulff, 547 (Def. Dis.)
Holemans, K., with Lambrecht, 551 (Def. Dis.)
Hollander, A. & Sommers, S. C., 219 (Lep.)
Holmes, J. W. E., 712 (R.F.)
Holstein, M., 901 (Mal.)
Holstein, M. H., 360 (B.R.)
Holway, R. T., Mitchell, W. A. & Salah, A. A., 656 (Ent.)
Holzman, D., with Scott & Johnson, 141 (Hel.)
Homawala, K. S., 1159 (Def. Dis.)
Honey, R. M., with Gelfand, 731 (Hel.)
Hood, M., Sodeman, W. A. & Akenhead, W. R., 215 (Am.)
van Hoof, L., Peel, E. & Chardome, M., 184 (Mal.)
Hoogstraal, H. (865) (Ent.)
Hopkins, C. A., 134 (Hel.)
—— & Nicholas, W. L., 1069 (Hel.)
Hopkins, G. H. E., 870 (B.R.)
—— & Rothschild, M., 1183 (B.R.)
Horgan, E. S., 74 (Reports, etc.)
——, with Dick, 403 (Y.F.)
Hornby, H. E., 17 (Tryp.)
Horner, M. C., with Horner, 867 (Reports, etc.)
Horner, W. H. & Horner, M. C., 867 (Reports, etc.)
Horrenberger, R., 505 (Rab.)
Horta, J. da S. & Delfim, J., (433) (Hel.)
Horth, R., with Floch, 819 (Lep.)
Hoskins, W. M., with Tahori, (1174) (Ent.)
Hotta, S., 620, 702 (Den.)
—— & Shiomi, T., 25 (Den.)
Houli, J. (644) (Sp.)
Houpeau, J. L. & Lhoste, J., 1099 (Ent.)
Howell, J. & Wyatt, J. P., 966 (Haem.)
Van Hoye, R., with de Scheitz, 688 (Tryp.)
Hoyem, H. M., with Thomas & Bozicevich, 750 (Hel.)
Hrenoff, A. K., with Nakamura & Anderson, 708 (Am.)
Hsiao, S. C., 629 (Lep.)
Hsieh, K. N., 140 (Hel.)
Hsu, D. Y. M. & Geiman, Q. M., 90 (Mal.)
Hu, S. M. K., (161) (Ent.)
Huber, H., (1083) (Prot.)
Huber, M., with Geigy, 199 (Tryp.)
Hudemann, H., with Wildführ, 566 (Prot.)
Hueck, O., 231, (Hel.) 238 (Def. Dis.)
Huff, C. G., 604 (Mal.)
Huffman, D. C., with McLeod & Magnuson, 313 (Ys.)
Hughes, E. S., with Shaw, (27) (Am.)
Hughes, H. B., with Schmidt, Schmidt, Ackermann, Hoffmann, Moore & Weiland, 481 (Mal.)
Hull, W. B., 159 (Ent.)
Humann, H., with Giroud, Boidé & Faucheux, 502 (Typh.)
Humphreys, J. (61), 333 (Haem.)
Humphries, J. M. & Grulee, C. G., Jr., 347 (Prot.)
Humphry, A. H., 1146 (Lep.)
Hunninen, A. V. 685 (Mal.)
Hunter, G. W., Freytag, R. E. & Ritchie, L. S., 321 (Hel.)
——, ——, ——, Pan, C., Yokogawa, M. & Potts, D. E., 129 (Hel.)
——, Ritchie, L. S. & Otori, Y., 226 (Hel.)
——, with ——, Pan, Yokogawa & Szewczak, 525 (Hel.)
Hunter, R. C., Jr. & Sheedy, J. A., 277 (Mal.)
Husbands, R. C., 251 (Ent.)
Hussein, A. G., (508) (Chl.)
Hussey, K. L., Shookhoff, H. B. & Sterman, M. M., 228 (Hel.)
Hutchinson, M. P., 1123 (Tryp.)

Huttel, N., with Huttel, (70) (Ent.), 261 (Reports, etc.)
——, with —— & Verdier, 768 (Ent.)
Huttel, W. & Huttel, N., (70) (Ent.), 261 (Reports, etc.)
——, —— & Verdier, P., 768 (Ent.)

I

Iannuzzi, B., with Romano, 294 (Leish.)
Ibarra Pérez, R. & González Prendes, M. A., 1051 (Lep.)
Ibrahim, M., with Gohar, El-Mofty, Eissa, Mousa, Sorour, Doss, Goma, Abou El-Wafa, El-Azhari & Mitri, 305 (Chl.)
Ichida, F., with Suzue & Imagawa, 33 (Lep.)
Ichiriu, E., with Levine, Chung-Hoon, Arakaki & Beatty, 123 (Lep.)
Ides, D., with Seneca, 651, 856 (Prot.)
Iimura, M., with Ishii, 706 (Am.)
Ikin, E. W., with Chalmers & Mourant, 965 (Haem.)
——, with Dreyfuss, Lehmann & Mourant, 144 (Haem.)
Imagawa, G., with Suzue & Ichida, 33 (Lep.)
Incho, H. H. & Greenberg, H., 352 (Ent.)
Inoki, S., 289 (Tryp.)
——, Kitaura, T., Nakabayasi, T. & Kurogochi, H., 394 (Tryp.)
——, Moriya, S. & Kobayashi, R., 504 (Den.)
——, Takada, S. & Nakabayasi, T., 1137 (Am.)
Irazábal, J., with Potenza & Barnola D., (336) (Haem.)
Irvin, J. L., with Parker, (278) *bis* (Mal.)
Irwin, J. O., with Adam, Ellis, Thomson & Weiner, 1163 (Heat Str.)
Irwin, R. S., 146 (Vms.)
Isaak, L. W., with Gjullin & Smith, 1087 (Ent.)
Isenberg, H. D., with Zaher, Rosenfeld & Schatz, 569 (Prot.)
Ishii, N. & Iimura, M., 706 (Am.)
—— & Ogawa, Y., 320 (Hel.)
—— & Tsuda, E., 129 (Hel.)
Ishii, S., with Sasa, Hayashi, Kano, Sato & Komine, 741 (Hel.)
Ishii, Y., 115, 1046 (Am.)
Israel, H. L., with LaBoccetta, Perri & Sigel, 805 (Typh.)
Itano, H. A., (551) (Haem.)
——, with Neel & Lawrence, 845 (Haem.)
Ives, J. C. J. & Thomson, T. J., 564 (Misc. Dis.)
Iyengar, M. O. T., 636 (Hel.)
Iyer, S. N., with Dudani, Krishna Murti & Shrivastava, 510 (Chl.)
Izard, Y. & Boquet, P., 849 (Vms.)
——, with ——, Bussard & Lesimple, 243 (Vms.)
Izzo, M. A., with Fabiani, 679, 680 (Mal.)

J

Jachowski, L. A., Jr. & Otto, G. F., 50 (Hel.)
——, with —— & Wharton, 832 (Hel.)
Jackson, C. H. N., 389, 394, 487, 800 (Tryp.)
Jackson, J. H., 550 (Def. Dis.)
Jacob, V. P. & Kalra, S. L., 96 (Leish.)
Jacobs, J. C., with Levitan, Durand & Petrus, 517 (Ys.)
Jacobs, L., 1080 (Prot.)
——, Jones, F. E. & Melton, M. L., 155 (Prot.)
——, Melton, M. L. & Jones, F. E., 344 (Prot.)
——, with Sabin, Eichenwald & Feldman, 567 (Prot.)
Jacobson, W., 85 (Mal.)
Jacobsson, E., 855 (Prot.)
Jadin, J., 479 (Mal.)
——, Fain, A. & Rupp, H., 189 (Mal.)
——, with Giroud, Le Gac & Gaillard, 297 (Typh.)
—— & Panier, E., 1034 (Typh.)
—— & Vercammen-Grandjean, P. H., 771 (Ent.)
Jaffé, L., 100 (Leish.)
Jalili, M. A. & Demarchi, M., 144 (Haem.)
——, —— & Abdul-Rahman Abdul-Ghani, 60 (Haem.)
Jame, P., with Copin & Martin, 675 (Mal.)
James, M. B., with Karlsson & Anderson, 707 (Am.)
——, with Nakamura, 611 (Tryp.)
Jameson, F. W., Jr. & Sasa, M., (865) (Ent.)
Jamnback, H., with Collins & Travis, 71 (Ent.)
Janssens, P. G., 52 (Hel.)
Jarniou, with Duroux, Colas & Celerier, (343) (Misc. Dis.)
Jarpa, A., Martini, J., González, O. & Saavedra, J., (534) (Hel.)
Jarpa G., A. & Allende U., J., (1138) (Am.)
——, with Armleder, 95 (Tryp.)
Jaswant Singh & Badri Nath Mohan, 273 (Mal.)
——, Basu, P. C. & Ray, A. P., 386 683 (Mal.)
——, Krishnaswami, A. K., Satya Prakash, Ray, A. P. & Ramakrishnan, S. P., 1015 (Mal.)
——, Misra, B. G., Ray, A. P., Basu, P. C. & Bami, H. L., 193 (Mal.)
—— & Raghavan, N. G. S., 831 (Hel.)
——, ——, Misra, B. G., Krishnaswamy, A. K. & Radhagovinda Roy, 133 (Hel.)
——, Ramakrishnan, S. P., Satya Prakash, Krishnaswami, A. K., Ray, A. P., Krishnan, K. S. & David, A., 194 (Mal.)
——, with Ray & Basu, 683 (Mal.)
——, Ray, A. P., Basu, P. C. & Misra, B. G., 678, 907 (Mal.)
——, ——, —— & Nair, C. P., 185, 281 (Mal.)
——, ——, Nair, C. P. & Basu, P. C., 10 (Mal.)
——, —— & Ramakrishnan, S. P., 193 (Mal.)
Jayewickreme, S. H. & Niles, W. J., 52 (Hel.)
Jeffery, G. M., with Coatney, Myatt, Hernandez & Cooper, 85 (Mal.)
——, Wolcott, G. B., Young, M. D. & Williams, D., Jr., 672 (Mal.)
Jelliffe, D. B., 154 *bis*, 249, 759, (853) (Misc. Dis.), 230 (Hel.) 240 (Haem.), 329, 842 (Def. Dis.)
——, with Jelliffe, E. F. P., 792 (Mal.)
——, with Jung, 55 (Hel.)
—— & Onwumere, R. E., 1121 (Mal.)
Jelliffe, E. F. P., with Jelliffe, 792 (Mal.)
Jenkins, D. W., with Hassett, (66) (Ent.)
Jennings, E. C., Jr. & Edwards, D. G., (1176) (Ent.)
Jensen, J. A., with Schoof & Siverly, 257 (Ent.)
Jerace, F., 600 (Mal.)
Jeropoli, N., with Allegra, 413 (Am.)
Jerusalem: Ministry of Health, 1008 (Mal.)
Jervis, O., (972) (Der.)
Jettmar, H. M., 230 (Hel.)
Jevtić, M., with Guelmino, 331 (Haem.)

Jiménez Díaz, C., Romeo, J. M. & Marina C., 842 (Sp.)
Jírovec, O., 764 (Prot.)
——, with Soyka, 158 (Prot.)
——, Soyka, O., Zázvorka, Z. & Voldřich, L., 856, (982) (Prot.)
Joannides, C. C., 1165 (Misc. Dis.)
Jobling, B., (769) (Ent.)
John, B., (734) (Hel.)
Johnson, C. M., with Thornburgh & Elton, 99 (Leish.)
Johnson, M., Kaye, M. A. G., Hems, R. & Krebs, H. A., (966) (Vms.)
Johnson, R. E., with Scott & Holzman, 141 (Hel.)
Johnson, W. S. & Buell, B. G., (85) (Mal.)
Jonchère, H., 200 (Tryp.)
——, Gomer, J. & Reynaud, R., 1024 (Tryp.)
—— & Pfister, R., 325 (Hel.)
——, —— & Ridet, J., 299 (Typh.)
Jones, E. B., 237 (Def. Dis.), 580 (Reports, etc.)
Jones, E. S., with Maegraith & Deegan, 384 (Mal.)
Jones, F. E., with Eyles & Smith, 1042 (Am.)
——, with Jacobs & Melton, 155, 344 (Prot.)
Jones, J. C., (570), 1085 (Ent.)
Jones, M. F. & Newton, W. L., 632 (Hel.)
Jones, S. A., 186, 906 (Mal.)
de Jong, J. C. M., 87 (Mal.)
Jopling, W. H. & Kirwan, E. W. O'G., 247 (Oph.)
Joseph, F. H., 952 (Hel.)
J. Amer. Med. Ass., 64 (Oph.), 378 *bis* (Mal.), 1098 (Ent.)
J. Parasitology, 1177 (Reports, etc.)
de Juan, A., with Tierkel, Arbona & Rivera, 303 (Rab.)
Judge, P. J., (1168) (Ent.)
Juillan, M., with Collignon, 998 (Mal.)
Jung, R. C. & Jelliffe, D. B., 55 (Hel.)
Junge, W., 1114 (B.R.)
Jüptner, H., with Kunert, 651 (Prot.)
Jutzy, D. A., Biber, S. H., Elton, N. W. & Lowry, E. C., 554 (Vms.)

K

Kabelitz, H. J., 347 (Prot.)
Kagan, I. G., 131 (Hel.)
—— & Lee, C., 430, (534) (Hel.)
Kagioka, T., with Ianaka & Sumiyoshi, 932 (Pl.)
Kahn, R. L. & Gutierrez Villegas, L., 147 (Der.)
Kakizaki, C., 324 (Hel.)
Kalbian, V. H. & Kalbian, V. V., 85 (Mal.)
Kalbian, V. V., with Kalbian, 85 (Mal.)
Kalra, S. L., (101) (Typh.)
——, with Jacob, 96 (Leish.)
Kamel, S., with Badir, 975 (Oph.)
Kane, J. H., with Seneca & Rockenbach, 120 (Am.)
Kano, R., with Sasa, Hayashi, Sato, Komine & Ishii, 741 (Hel.)
Kaplan, D., with Koch, 510, 705 (Chl.)
Kaplan, E., with Neel & Zuelzer, 1161 (Haem.)
——, Zuelzer, W. W. & Neel, J. V., 1161 (Haem.)
Kariv, I., 1059 (Hel.)
Karlsson, J. L., 707 (Am.)
——, James, M. B. & Anderson, H. H., 707 (Am.)
Karrer, H. E., 971 (Der.)
Kartman, L., 835 (Hel.)
——, with Love, 1014 (Mal.)
Kartman, L. & Mays, B. M., 6 (Mal.)
Kashyap, S. P., with Rajindar Pal, Sharma & Krishnamurthy, 480 (Mal.)
Kasman, S., Roadhouse, L. A. O. & Wright, G. F., 1168 (Ent.)
Kåss, E., with Steen, 249 (Prot.)
Kass, E. H., Andrus, S. B., Adams, R. D., Turner, F. C. & Feldman, H. A., 157 (Prot.)
Katzenellenbogen, I., with Adler, 99 (Leish.)
Kawamura, R., with Taniguchi & Okuno, 852 (Oph.)
Kaye, M. A. G., with Johnson, Hems & Krebs, (966) (Vms.)
Kearns, C. W., with Sternburg & Vinson, 1173 (Ent.)
Keay, R. W. J., with Nicholas, Kershaw & Zahra, 748 (Hel.)
Keegan, H. L., 337 (Vms.)
——, with Applewhite & Hedeen, 1084 (Ent.)
Keen, R., with Pascher & Simm, 145 (Haem.)
Keener, G. G., Jr., 160 (Ent.)
Kehne, E. F., with Reagan, Day, Moore & Brueckner, 506 (Rab.)
Kehoe, E. L., with Chandler, (243) (Haem.)
Kelly, F. C., with Lamb, Shackelford, Rebell & Koons, 646 (Der.)
Kemper, H., 261 (Reports, etc.), 652 (Ent.)
Kendall, S. B., (1063) (Hel.)
Kendrick, E. L., with Foster, Walton & Williams, (34) (Lep.)
Kennedy, J., 1111 (B.R.)
Kenney, M., 116 (Am.)
Kenney, R. A., 642 (Def. Dis.)
——, with Phillips, 328 (Def. Dis.)
Keppie, A. A. N., with Browning & Adamson, 1026 (Tryp.)
Kershaw, W. E., 746, 834 (Hel.)
——, with Nicholas, Keay & Zahra, 748 (Hel.)
——, with Ross & Kurowski, 634 (Hel.)
—— & Williamson, J., 436 (Hel.)
——, with ——, 436 (Hel.)
Kessel, J. F., with Beye, Edgar, Mille & Bambridge, 47 (Hel.)
——, with ——, Heuls, Thooris & Bambridge, 738 (Hel.)
Ketterer, W. A., 986 (Reports, etc.)
Kettle, D. S. & Lawson, J. W. H., (70) (Ent.)
Khatri, L. D., 1136 (Pl.)
Kieler, J., with Helweg-Larsen, Hoffmeyer, Thaysen, Thaysen, Thygesen & Wulff, 547 (Def. Dis.)
Kilpatrick, J. W., with Maier, Baker, Bogue & Quarterman, 350 (Ent.)
—— & Quarterman, K. D., 350 (Ent.)
King, F. A., (1177) (Reports, etc.)
Kinnear, A. A., with le Riche, Loewenthal, Boshoff & Smit, 548 (Def. Dis.)
Kirk, R. & Lewis, D. J., 465, (983) (Ent.)
Kirman, B. H., with Burkinshaw & Sorsby, 568 (Prot.)
Kirwan, E. W. O'G., with Jopling, 247 (Oph.)
Kisner, C. D., Stoffberg, N. & de Meillon, B., 733 (Hel.)
Kitamura, K., 139 (Hel.)
Kitaoka, M., 71 (Ent.)
——, with Takemori, 397 (Typh.)
——, with —— & Henmi, 614 (Typh.)
Kitaura, T., with Inoki, Nakabayasi & Kurogochi, 394 (Tryp.)

Kitchen, W. H. & Gall, D., 1168 (Ent.)
Kivits, M., 52 (Hel.)
Kletter, G., Winckel, W. E. F. & Collier, W. A., 647 (Der.)
Klock, J. W., Pimentel, D. & Stenburg, R. L., (983) (Ent.)
Knapp, W., 455 (Prot.)
Knight, A. A. & Tarun, D. W., 28 (Am.)
Knight, K. L. & Marks, E. N., (462) (Ent.)
Knipe, F. W. & Frings, H., (657), 861 (Ent.)
Knönagel, H., 959 (Hel.)
Knorr, R., 221 (Lep.), 792 (Mal.)
Knutson, H., 209 (Typh.)
Knyvett, A. F. & Schofield, F. D., 997 (Mal.)
Kobayashi, R., with Inoki & Moriya, 504 (Den.)
Koch, W. & Kaplan, D., 510, 705 (Chl.)
Kocher, C., with Wiesmann, 1093 (Ent.)
Kocijančič, K., with Stergar & Silc, (978) (Prot.)
Kocis, S. L., with Heffernon & Hittner, 450 (Heat Str.)
Kocsard, E., with Sagher & Liban, 421 (Lep.)
Koenig, K., with Fuhrmann, 813 (Am.)
Koerner, J. F., with Sinsheimer, (146) (Vms.)
Kohler, C. E., with Norris, Schneider, Hanchett & Buren, 1135 (Pl.)
Kohls, G. M., (865) *bis* (Ent.)
Koite, P., with Diagne, Michel & Veyret, 934 (Pl.)
Koletsky, S., with Bueding, Peters & Moore, 533 (Hel.)
Komine, I., with Sasa, Hayashi, Kano, Sato & Ishii, 741 (Hel.)
Komiya, Y., Yokogawa, M., Chichijo, K., Nishimiya, H., Suguro, T. & Yamaoka, K., 633, 1063 (Hel.)
Komp, W. H. W., 211 (Y.F.)
Kondi, A., with Foy, Rebello & Martins, 61 (Haem.)
Kono, M., with Tanimura & Nishimura, 820 (Lep.)
Koons, R. C., with Lamb, Kelly, Shackelford & Rebell, 646 (Der.)
Koppisch, E., with Diéz Rivas & Hernández Morales, 239 (Sp.)
Koprowski, H. & Black, J., 303 (Rab.)
Koshiro, Y., with Yoshie, Takeda & Hattori, 819 (Lep.)
Kostich, D. Y., 254 (Ent.)
Kourí, P. & Valdés Díaz, R., 54 (Hel.)
Koutz, F. R. & Groves, H. F., (537) (Hel.)
Kouwenaar, W., 74 (Reports, etc.), 928 (Y.F.)
Kozar, Z., 345 (Prot.)
——, with Hirschlerowa, 565 (Prot.)
——, Wysocka, F. & Bławat, F., 236 (Hel.)
——, —— & Sikorska, S., 346 (Prot.)
Kozmar, D., with Cvjetanović, Fališevac, Mihaljević, Topolnik & Vesenjak-Zmijanac, 1133 (Typh.)
Kraus, C., with Geigy, (260) (Ent.)
Krebs, H. A., with Johnson, Kaye & Hems, (966) (Vms.)
Krishnamurthy, B. S., with Rajindar Pal, Sharma & Kashyap, 480 (Mal.)
Krishna Murti, C. R., with Dudani, Iyer & Shrivastava, 510 (Chl.)
Krishnan, K. S., with Jaswant Singh, Ramakrishnan, Satya Prakash, Krishnaswami, Ray & David, 194 (Mal.)
——, with Ramakrishnan & Satya Prakash, 90 (Mal.)
Krishnaswami, A. K., 375 (Mal.)
——, with Jaswant Singh, Ramakrishnan, Satya Prakash, Ray, Krishnan & David, 194 (Mal.)
——, with ——, Satya Prakash, Ray & Ramakrishnan, 1015 (Mal.)
——, with Ramakrishnan & Satya Prakash, (90) (Mal.)
——, with Satya Prakash & Ramakrishnan, 797 (Mal.)
Krishnaswamy, A. K., with Jaswant Singh, Raghavan, Misra & Radhagovinda Roy, 133 (Hel.)
Krug, O., with Chaussinand & Viette, 523 (Lep.)
Krupp, I. M., with Sadun & Everritt, 307 (Am.)
Krusé, C. W., Hawkins, W. B. & Ludvik, G. F., 383 (Mal.)
——, Ludvik, G. F. & Hawkins, W. B., 87 (Mal.)
Kruszyński, J., 282 (Mal.)
Kryński, S. & Radkowiak, J., 206 (Typh.)
Kuhlow, F., 735 *bis* (Hel.)
Kullman, H. J., with Buchman & Margonis, 308 (Am.)
Kunert, H. & Jüptner, H., 651 (Prot.)
—— & Schmidtke, L., 855 (Prot.)
Kuntz, R. E., 40 (Hel.)
Kuper, S. W. A. & Pelc, S. R., 484 (Mal.)
Kurogochi, H., with Inoki, Kitaura & Nakabayasi, 394 (Tryp.)
Kurowski, A. C., with Ross & Kershaw, 634 (Hel.)
Kushlan, S. D., 962 (Hel.)
Kviatkovsky, O., with Bablet & Canet, 438 (Def. Dis.)

L

Laarman, J., 1043 (Am.)
Laarman, J. J., (116) (Am.)
Labcoccetta, A. C., Israel, H. L., Perri, A. M. & Sigel, M. M., 805 (Typh.)
Lacerda, J. H. de M., with da Fonseca, Passalacqua, de Lima & de Oliveira, (692) (Tryp.)
——, with Ramos, Brando & Sampaio, (1028) (Tryp.)
Lachmajer, J., 183 (Mal.)
Lack, A. R., with Wier, Egeberg & Leiby, 62 (Der.)
Lacroix, M., Mazzuca, M. & Bonnet, M., 187 (Mal.)
Lagrange, E., with Fain, 40 (Hel.)
——, with Tomberg, 958 (Hel.)
Lahitte, F. G. (9) (Mal.)
——, with Carayon & d'Almeida, 450 (Ulc.)
Laidin Bin Alang Musa, with Burgess, 549 (Def. Dis.)
de Lajudie, P. & Brygoo, E. R., 649 (Misc. Dis.)
Lal, S. B. (141), 1160 (Def. Dis.)
Lallemand Carpio, A. & Gasalla Chacón, J. M., (635) (Hel.)
Lamarquand, with Edgar, Beye, Mille & Bambridge, 539 (Hel.)
Lamb, J. H., Kelly, F. C., Shackelford, P. O., Rebell, G. & Koons, R. C., 646 (Der.)
——, with Morgan & Shackelford, 1073 (Der.)
Lamb, K. P., 351 (Ent.)
Lamberton, R., with Mercier & Courdurier, 621 (Rab.)
Lambrecht, A. & Holemans, K., 551 (Def. Dis.)
Lamprell, B. A. & Cheek, E., 753 (Haem.)
Lamy, L., with Deschiens & Estival, 978 (Misc. Dis.)

Lancaster, H. O., 812 (Am.)
Lancet, 150 (Heat Str.)
Landau, J., Bachrach, U. & Gurevitch, J., 1142 (Lep.)
——, with ——, —— & Birnbaum, 559 (Oph.)
De Langen, C. D., 965 (Sp.)
Langeron, M., 359 (B.R.)
Languillon, J., 332, 333 (Haem.)
Lapieza Cabral, P., with Borzone, (762) (Prot.)
Laplanche, C., with Bousser, Antonelli & Audry, (845) (Haem.)
Laranja, F. S., Dias, E., Duarte E. & Pellegrino, J., 610 (Tryp.)
Larribaud, J., 648 (Misc. Dis.)
Larsen, E., with Smith, 476 (Mal.)
Larsh, J. E., Jr., 416 (Am.)
Larson, A., with McCrumb & Meyer, 934 (Pl.)
——, with Walker, Foster, Chen & Meyer, 623 (Pl.)
Lasserre, R., with Roch, 712 (Am.)
Lasslo, A., with Balamuth, 120 (Am.)
Latham, W. J., with Selkon, (235) (Hel.)
Laufer, A., with Gurevitch, 277 (Mal.)
Laufer, W. E., 649, 1164 (Misc. Dis.)
—— & Freedman, M. L., 478 (Mal.)
Launoy, L., 290 (Tryp.)
—— & Prieur, M., 1028 (Tryp.)
Laurie, W., 45 (Hel.), 171 (Reports, etc.)
Lavalle Aguilar, P., with González Ochoa, Martínez Báez & Castro Estrada, 220 (Lep.)
Laverde, A., 294 (Leish.)
Lavier, G., 707 (Am.)
Lawlis, J. F., Jr., with McCowen, Callender & Brandt, 710 (Am.)
Lawrence, J. S., with Neel & Itano, 845 (Haem.)
Lawson, J. W. H., with Kettle, (70) (Ent.)
Leal, R. A. & Amaral, A. D. F., 29, 940 (Am.)
Lebied, B., with Wanson, 545, (639) (Hel.), 1097 (Ent.)
Le Blaye, R., (792) (Mal.)
Lecuiller, A., with Floch, 221 (Lep.)
——, with —— & Sureau, 221, 316, 424 (Lep.)
Leduc, Y., with Lemaire, Camain, Postel & Ehrhard, 968 (Vms.)
Lee, C., with Kagan, 430, (534) (Hel.)
Lee, P., with Senior White & Lewis, 674 (Mal.)
Lee, P. E., 103 (Typh.)
Leeson, H. S., 608 (Tryp.)
Lefrançois, R., with Coutelen, Biguet & Obez, 140 (Hel.)
Le Gac, P., (72), (465), (660) (Ent.), 516, (517) (Ys.), (615) (Typh.)
——, Floch, H. & Chassignet, R., (256) (Ent.)
——, with Giroud & Gaillard, 65 (Prot.)
——, with ——, Jadin & Gaillard, 297 (Typh.)
——, with —— & Le Hénaff, 101 (Typh.)
——, Giroud, P. & Lemaigre, C., 295 (Typh.)
—— & Mulet, M., 689 (Tryp.)
——, Sauermann, M. & N'Koa, A., 631 (Hel.)
—— & Ziegler, P., 288 (Tryp.)
Le Hénaff, A., with Giroud & Le Gac, 101 (Typh.)
le Henand, F., with Charmot & Giudicelli, 941 (R.F.), 1045 (Am.)
——, with ——, Mathieu, Sylla & Ouedraogo, 118 (Am.)
Lehmann, H., 756 (Haem.)
——, with Dreyfuss, Ikin & Mourant, 144 (Haem.)
—— & Silk, E., 168 (Lab.)
Lehmann de Almeida, C. G., 435 (Hel.)
Leiby, G. M., with Wier, Egeberg & Lack, 62 (Der.)
Leleup, N., 653 (Ent.)
—— & Lips, M., 653 (Ent.)
——, with Vincke, 653 (Ent.)
Lelong, M. & Desmonts, G., 64 (Prot.)
Lemaigre, C., with Le Gac & Giroud, 295 (Typh.)
Lemaire, R., Camain, P., Postel, R., Leduc, Y. & Ehrhard, S., 968 (Vms.)
le Mare, D. W., 440 (Vms.)
Lendrum, F. C., 313 (Lep.)
Lennette, E. H., with Abinanti, Welsh & Brunetti, 699 (Typh.)
——, with Berge, 698, 700 (Typh.)
Leonardi, O. & Consoli, A., 499 (Leish.)
Leong, P. C. & Strahan, J. H., 551 (Def. Dis.)
Lepesme, P. & Doucet, J., 966 (Vms.)
Leprosy in India, 817 (Lep.)
Leproux, P. H., with Bonnin & Moretti, 79 (Mal.)
Leria de la Rosa, M., with Piedrola Gil, 621 (Rab.)
Le Riche, H., Kinnear, A. A., Loewenthal, L. J. A., Boshoff, P. H. & Smit, R. J., 548 (Def. Dis.)
Lesimple, D., with Boquet, Bussard & Izard, 243 (Vms.)
Lester, H. M. O., 389 (Tryp.)
Lestrade, P., (309) (Am.)
Levaditi, C., Vaisman, A. & Hamelin, A., 219 *bis* (R.F.), 310 (R.F.)
——, with —— & ——, 941 (R.F.)
Levaditi, J. C., 10 (Mal.)
Levi, A. A., with Crowther, 485 (Mal.)
Levi-Castillo, R., (570), 982 (Ent.), 807 *bis* (Y.F.)
Levine, M., Chung-Hoon, E. K., Ichiriu E., Arakaki, J. & Beatty, M., 123 (Lep.)
——, with Stitt, 1080 (Prot.)
Levitan, M., with Cochran & Grayson, (466) (Ent.)
Levitan, S., Durand, J. B., Petrus, E. & Jacobs, J. C., 517 (Ys.)
Lewallen, L. L., with March & Metcalf, 463 (Ent.)
Lewert, R. M., 197, 198 (Mal.)
Lewis, D. J., 543 (Hel.), 769, 858 (Ent.)
——, with Kirk, 465, (983) (Ent.)
Lewis, E. A., 389, 1018 (Tryp.)
Lewis, G., with Senior White & Lee, 674 (Mal.)
Lewis, H. B., with Schulert, 249 (Misc. Dis.)
Lewthwaite, R., 101 (Typh.)
Ley, H. L., Jr., Diercks, F. H., Paterson, P. Y., Smadel, J. E., Wisseman, C. L., Jr. & Traub, R., 207 (Typh.)
——, with Smadel, Diercks & Cameron, 207 (Typh.)
——, Smadel, J. E., Diercks, F. H. & Paterson, P. Y., 208 (Typh.)
Leyva, R. D., with Colorado Iris, 316 (Lep.)
Lhoste, J., with Houpeau, 1099 (Ent.)
Li, S. Y., (131), (734) (Hel.)
Liang, K. C., with Chow & Pletsch, 475 (Mal.)
Liban, E., with Sagher & Koesard, 421 (Lep.)
Lie Kian Joe, with Bintari Sumardjo, 626 (Am.)
——, with Tan Kok Siang, (1067) (Hel.)
Lièvre, J. A. & Rénier, J. C., (846) (Haem.)
Lim, B. L., with Harrison, 1033 (Typh.)
de Lima, A. R., with da Fonseca, Passalacqua, de Oliveira & Lacerda, (692) (Tryp.)
——, with Schiavi & Ramos, 1028 (Tryp.)
Lima, F. O., with Corrêa & Carvalho, 692 (Tryp.)
Lima, L. I. de A. & Barbosa, F. S., 1158 (Hel.)
Lima, M. M., 1117 (Mal.)
Lima, S. de O., 123, 124 (Lep.)

Limbos, P., with Courtois, (344) (Misc. Dis.)
——, with Thys, Courtois, Vanbreuseghem, Baker, Bertrand, de Muyncke & Verselder, 444 (Der.)
Limentani, D., with Ludwin & Dameshek, 145 (Haem.)
Lindquist, A. W., with Gjullin & Butts, 253 (Ent.)
——, with Roth & Terriere, 861 (Ent.)
Linhard, J., Busson, F., Giraud, P. & Guyonnet, C., 840 (Def. Dis.)
Link, V. B., 749 (Hel.)
Linley-Adams, J. C., 605 (Bl.)
Lipovsky, L. J., 260 (Ent.)
Lipparoni, E., 529 (Hel.)
Lippi, M., Capocaccia, L. & Cao-Pinna, M., 411 (Am.)
Lips, M., with Leleup, 653 (Ent.)
Lips, M. A. H., 8 (Mal.)
Liqui Lung, M. A. V., with Fros, 1158 (Hel.)
Livadas, G., 909 (Mal.)
Lividas, G. A. & Georgopoulos, G., 1007 (Mal.)
Lloyd, H. M., 914 (Tryp.)
Lobo, M. B., Moreira, M. & de Oliveira, J. E., 128 (Hel.)
Lock, J. A., 763 (Prot.)
Lockard, D. H. & Fisk, F. W., 865 (Ent.)
Loewenthal, L. J. A., with le Riche, Kinnear Boshoff & Smit, 548 (Def. Dis.)
Logan, J. A., 909 (Mal.)
van Loghem, J. J., Sr., 74 (Reports, etc.)
Lombard, E. A., with Witham & Remington, (1073) (Vms.)
Lopes, A., 301 (Typh.)
Lopez Rico, A., with Edmundson & Olansky, 942 (Ys.)
Lopez-Toca, R., with Spies, Stone, Suarez, Garcia-Lopez & Reboredo, 755 (Haem.)
Loretti, G. A., (1130) (Tryp.)
Lorrain, J. M., (261) (Reports, etc.)
Lotte, A. J., 286, 1025 (Tryp.)
Lotte, J. L., with Mihail, 149 (Heat Str.)
Louis, L. A. & Charles, P., 868 (Reports, etc.)
Loures, J. de C. & Bastos, A. F., 584 (Reports, etc.)
Lourie, E. M., 17, 687 (Tryp.)
Love, G. J. & Kartman, L., 1014 (Mal.)
——, Wilkin, S. A. & Goodwin, M. H., Jr., 684 (Mal.)
Love, J., Foulk, R., Williams, R. G. W., Jr. & Mitchell, R. B., 378 (Mal.)
Lowe, J., 36, 126, 127, 720, 1147 (Lep.), 791 (Mal.)
—— & McNulty, F., 948 (Lep.)
Lowry, E. C., with Jutzy, Biber & Elton, 554 (Vms.)
Lu, Y. C., Yu, K. Y. & Chang, Y. Y., (628) (Ys.)
Lucasse, C., 155 (Misc. Dis.)
de Lucena, D. T., 490 (Tryp.), 531 (Hel.)
—— & Costa, L., 1128 (Tryp.)
Ludvik, G. F., 1169 (Ent.)
——, with Krusé & Hawkins, 87, 383 (Mal.)
Ludwin, I., Limentani, D. & Dameshek, W., 145 (Haem.)
Lumbroso, P., with Cattan & Frumusan, (1156) (Hel.)
Lumsden, W. H. R. & Van Someren, E. C. C., 858 (Ent.)
Lundie, J. K., with Beresowski, 59 (Def. Dis.)
Lurie, H. I., with de Meillon & Stoffberg, 631 (Hel.)
Lurie, H. I., de Meillon, B., Stoffberg, N. & Eiselen, H. H., 729 (Hel.)
Luttermoser, G. W. & Phillips, B. P., 27 (Am.)
Lysaght, A. M., 470 (B.R.)

M

Ma, K. C., with Fu, 734 (Hel.)
McAnally, W. J., Jr., with Cabrera M. & Montoya, 697 (Typh.)
MacArthur, W., 518 (Lep.), 1179 (B.R.)
Macauley, W. L., with Madden, 1005 (Mal.)
McConnachie, E. W., 387 (Mal.)
——, with Bishop, 387 (Mal.)
McCowen, M. C., Callender, M. E., Lawlis, J. F., Jr. & Brandt, M. C., 710 (Am.)
McCoy, J. H., with Marmion, Stoker, Malloch & Moore, 501 (Typh.)
McCreery, P. M., with Ranta, 1137 (Chl.)
MacCrumb, F. R., with Mercier, 406 *bis* (Pl.)
McCrumb, F. R., Jr., Larson, A. & Meyer, K. F., 934 (Pl.)
——, Mercier, S., Robic, J., Bouillat, M., Smadel, J. E., Woodward, T. E. & Goodner, K., 933 (Pl.)
Macdonald, E. M. & Scott, J. A., 743 (Hel.)
——, with ——, 743 (Hel.)
Macdonald, G., 280, 871, 910 (Mal.)
McDonnell, C. C., 577 (Ent.)
McDuffie, W. C., with Gilbert & Couch, 861 (Ent.)
de Macedo, J. J., Brandão, C. H. & Monteiro, E. L., 209 (Typh.)
MacFadyen, D. A., with Sunderman, MacFate, Stevenson & Copeland, (965) (Haem.)
MacFadyen, E., 1177 (B.R.)
McFadzean, A. J. S. & Wong, C. C., 336 (Haem.)
McFadzean, J. A., 640 (Hel.)
MacFarlane, W. V., 42 (Hel.)
MacFate, R. P., with Sunderman, MacFadyen, Stevenson & Copeland, (965) (Haem.)
McGhee, R. B., 681 (Mal.)
McGiff, J., with Blumberg & Guicherit, 1067 (Hel.)
McGregor, I. A., Hawking, F. & Smith, D. A., 232 (Hel.)
—— & Smith, D. A., 57 (Def. Dis.)
Machado, H. & Pinto, O. da S., 492 (Tryp.)
Machado Filho, J. & De Carvalho, M. da C. M., 972 (Der.)
McHardy, G., Bechtold, J. E., Welch, G. E. & Browne, D. C., 939 (Am.)
Macheboeuf, M., with Ganzin, Rebeyrotte & Montezin, 93 (Tryp.)
MacKay, D. H. & Martin, W. J., 261 (Reports etc.)
McKee, M. T., with Parker, Bell, Chalgren & Thrailkill, 399 (Typh.)
MacKeith, R., with Watson, 328 (Hel.)
Mackerras, I. M. & Mackerras, M. J., (351) (1168) (Ent.)
Mackerras, M. J., with Mackerras, (351), (1168 (Ent.)
Mackey, J. P., 584 (Reports, etc.)
McKey, R. W., with Townsend, 1075 (Der.)
McLeod, C. P. & Magnuson, H. J., with Huffman, D. C., 313 (Ys.)
McLintock, J., 461 (Ent.)
McManus, J. F. A., with Bragdon, 439 (Vms.)
McMullen, D. B., 41 (Hel.)

Macnamara, F. N., 808 (Y.F.)
MacNalty, A. S., 355 (B.R.)
McNulty, F., with Lowe, 948 (Lep.)
McQuay, R. M., Jr., 1060 (Hel.)
McRary, W. L., Beaver, E. L. & Noble, E. R., 918 (Tryp.)
McRobert, G., 85 (Mal.)
McRobert, G. R., with Rogers & Megaw, 262 (B.R.)
Madden, J. F. & Macauley, W. L., 1005 (Mal.)
Maddison, S. E., with Elsdon-Dew, 117 (Am.)
Madwar, S. & Zahar, A. R., 1090 (Ent.)
Maeda, H., with Yaoi & Takei, 109, 622 (Rab.)
——, with ——, ——, Saito & Yamasawa, 623 (Rab.)
Maegraith, B. G., 152 (Heat Str.), 329 (Sp.)
——, with Adams, 1108 (B.R.)
——, with Andrews, 469 (Reports, etc.)
——, Deegan, T. & Jones, E. S., 384 (Mal.)
Magalhães Neto, B., 1156 (Hel.)
——, with Edwards & Dobbin, (1154) (Hel.)
Maggiolo, A., with Hitchings, Russell, VanderWerff & Rollo, (87) (Mal.)
Magnanelli, P., with Tripodi, 28, 217 (Am.)
Magnuson, H. J., with McLeod & Huffman, 313 (Ys.)
Maier, P. P., Baker, W. C., Bogue, M. D., Kilpatrick, J. W. & Quarterman, K. D., 350 (Ent.)
Maillot, L., 914 (Tryp.)
Maino, M., (1105) (Reports, etc.)
Makari, J. G., 340 (Oph.), 466 (Lab.)
Malloch, R. A., with Marmion, Stoker, McCoy & Moore, 501 (Typh.)
—— & Stoker, M. G. P., 400 (Typh.)
Maloney, P. J., 442 (Der.)
Mancy, E. S., 1144 (Lep.)
Mandoul, R. & Pestre, A., 904 (Mal.)
Manefield, T., 159 (Ent.)
Mangalik, V. S., with Gupta, Mehrotra & Chandy, 629 (Lep.)
Mann, E. R., with Nolan & Bond, 1061 (Hel.)
Manson-Bahr, P., 231, 542 *bis* 834 (Hel.)
Manson-Bahr, P. E. C., 59 (Def. Dis.)
Manso Soto, A. E. & Rispoli, J. A., (1129) (Tryp.)
Mansour, T. E., with Chance, 825 (Hel.)
Mantovani, A. & Benazzi, P., 617 (Typh.)
Manwell, R. D., Alpert, S. & Powers, D., 604 (Mal.)
—— & Glenn, S., 685 (Mal.)
March, R. B., with Metcalf, (866) (Ent.)
——, Metcalf, R. L. & Lewallen, L. L., 463 (Ent.)
Marco Ahuir, R., Torrella Gil, E. & Alcaraz Garcia, M., 422 (Lep.)
Marcotorchino, J. D., Méar, Y. & Courson, B., (1079) (Ulc.)
Marcuzzi, G., 202 (Tryp.)
——, with Pifano C., 202 (Tryp.)
Maretić, Z., 967 (Vms.)
Marett, W. C., 583 (Reports, etc.)
Margonis, G. F., with Buchman & Kullman, 308 (Am.)
Marie-Suzanne, Noel, R. & Sohier, R., 1150 (Lep.)
Marina, C., with Jiménez Díaz & Romeo, 842 (Sp.)
Markowski, B., (831) (Hel.)
Marks, E. N., with Knight, (462) (Ent.)
Marlier, G., 70 (Ent.)
Marmion, B. P., Stoker, M. G. P., McCoy, J. H., Malloch, R. A. & Moore, B., 501 (Typh.)
Mar Moñux, R., with Zubiri & Vidal, 950 (Lep.)
Marples, M. J. & Bacon, D. F., 717 (Ys.)
Martin, G. A., Garfinkel, B. T., Brooke, M. M., Weinstein, P. P. & Frye, W. W., 710 (Am.)
Martin, J. R., with Copin & Jame, 675 (Mal.)
Martin, M., with Blanc, Villa & Mayan, 414 (Am.)
Martin, W. J., with MacKay, 261 (Reports, etc.)
Martin de Mirandol, P., with Montestruc & Blache, 811 (Am.)
Martinez Baez, M., 437, 1070 (Hel.)
——, with González Ochoa, Lavalle Aguilar & Castro Estrada, 220 (Lep.)
—— & Tello de la Peña, R., 325 (Hel.)
Martínez Palacios, A., with Vargas, 1173 (Ent.)
Martini, E., 1181 (B.R.)
Martini, J., with Jarpa, González & Saavedra, (534) (Hel.)
Martins, F., with Foy, Kondi & Rebello, 61 (Haem.)
Martins, R., with Deane, 1029 (Tryp.)
Maryon, M., with Covell & Shute, 795, 1118 (Mal.)
Masland, R. L., with Rosenblum & Harrell, 103 (Typh.)
Massardo-Raymaekers, with Parent, 1159 (Def. Dis.)
Massi, O., with Biocca, 322 (Hel.)
Massonnat, J., with Portier & Zevaco, 845 (Haem.)
Mastrandrea, G., with de Paola, 1068 (Hel.)
Mathieu, J., with Peel & Mestdagh, 5 (Mal.)
Mathieu, P., with Charmot, le Henand, Sylla & Ouedraogo, 118 (Am.)
Mathis, W. & Quarterman, K. D., 766 (Ent.)
——, with ——, 351 (Ent.)
Matsubayashi, H., 309 (Am.)
Mattingly, P. F., 67 (Ent.), 870 (B.R.)
de Mattos, A., with Garcia & Bürger, 960 (Hel.)
Mauri, A. C., with Hadler & Carvalho, 425 (Lep.)
——, with Planet, Oliveira & Carvalho, 724 *bis* (Lep.)
Maurin, J., 925 (Typh.)
——, with Vermeil, 763 (Prot.)
Mauzé, J., (249) (Misc. Dis.)
—— & Arnaud, G., 1143 (Lep.), 1166 (Misc. Dis.)
——, with Deschiens, 760 (Misc. Dis.)
May, G., with Herzberg & Herzberg-Kremmer, 456 (Prot.)
May, J. M., 109 (Pl.), 174 *bis* (Reports, etc.), 426 (Hel.)
Mayan, L., with Blanc, Martin & Villa, 414 (Am.)
Mayer, R. L., with Eisman & Geftic, 1149 (Lep.)
Mays, B. M., with Kartman, 6 (Mal.)
Mazzotti, L., 437 (Hel.)
Mazzuca, M., with Lacroix & Bonnet, 187 (Mal.)
Méar, Y., with Marcotorchino & Courson, (1079) (Ulc.)
Médecine Trop., 578 (Ent.)
Medical Research Council, 984 (Reports, etc.), 1163 (Heat Str.)
Medina, R., Convit, J. & Contreras, R., 243 (Der.)
——, with Pifano, C. & Anduze, 201 (Tryp.)
Megaw, J. W. D., with Rogers & McRobert, 262 (B.R.)
Mehrotra, T. N., with Gupta, Mangalik & Chandy, 629 (Lep.)
Meira, J. A., with Ferreira, (320) (Hel.)
——, Nobrega, P. & Neto, V. A., (348) (Prot.)
de Meira, M. T. V., 601 (Mal.)
Meleney, H. E., with Moore, Thillet & Carney, 954 (Hel.)

Melsom, R. S., 122, 519 (Lep.)
——, with Møller-Christensen, Bakke & Waaler, 424 (Lep.)
Melton, M. L., with Jacobs & Jones, 155, 344 (Prot.)
Mendoza Mendoza, P., 751 (Def. Dis.)
Menezes, H., with Coutinho, (650) (Misc. Dis.)
Menna, F., with Ricci, 725 (Hel.)
Menon, P. B., with Basu & Sen Gupta, (1097) (Ent.)
Menon, P. S., with Narayanan, 26 (Chl.)
Mer, G. G., 1093 (Ent.)
Mercado, T. I., 383 (Mal.)
—— & Coatney, G. R., 679 (Mal.)
Mercier, E. C., with Muirhead-Thomson, 275, 376 (Mal.)
Mercier, S., 677 (Mal.)
——, Courdurier, J. & Lamberton, R., 621 (Rab.)
—— & Mac Crumb, F. R., 406 *bis* (Pl.)
——, with McCrumb, Robic, Bouillat, Smadel, Woodward & Goodner, 933 (Pl.)
Merland, R., with Touzin, 316 (Lep.)
Mestdagh, M., with Peel & Mathieu, 5 (Mal.)
Metcalf, R. L. & March, R. B., (866) (Ent.)
——, with —— & Lewallen, 463 (Ent.)
Métraux, A., (585) (Reports, etc.)
Meyer, A. & Naveau, P. P., 503 (Typh.)
Meyer, K. F., with McCrumb & Larson, 934 (Pl.)
——, with Walker, Foster, Chen & Larson, 623 (Pl.)
Meyer, L. M. & Bertcher, R., 331 (Sp.)
——, with ——, 331 (Sp.)
Michael, K. M. M. & Cooray, G. H., 215 (Am.)
Michaelson, J. B., DeLamater, J. N. & Talpis, L., 1042 (Am.)
Michalzik, K., 1083 (Prot.)
Michel, L., with Diagne, Koite & Veyret, 934 (Pl.)
Micka, F., with Nemec, (636) (Hel.)
Micks, D. W. & Calma, V. C., 1096 (Ent.)
——, with Rigdon & Breslin, 386 (Mal.)
Middlekauff, W. W., (464) (Ent.)
Migliaro, E. F., with Osimani & Abella, 736 (Hel.)
Miguel Herrera, J., (117) (Am.)
Mihail, A. & Lotte, J. L., 149 (Heat Str.)
Mihaljević, F., with Cvjetanović, Fališevac, Kozmar, Topolnik & Vesenjak-Zmijanac, 1133 (Typh.)
Mikolajczyk, E., with Wojciechowski, 613 (Typh.)
Miles, V. I. & Wilcomb, M. J., Jr., 1136 (Pl.)
Millar, J. W., 1149 (Lep.)
Mille, R., with Beye, Edgar, Kessel & Bambridge, 47 (Hel.)
——, with Edgar, Beye, Bambridge & Lamarquand, 539 (Hel.)
Miller, A. R., 749 (Hel.)
Miller, H., with Terzian & Stahler, 797 (Mal.)
Miller, L. T. & Feldman, H. A., 979 (Prot.)
Miller, M. J., 29 (Am.), 1065 (Hel.)
Miller, M. M., with Weinstein & Garfinkel, 309 (Am.)
Miller, M. S., with Florio & Mugrage, 403 (Den.)
Mirsa, M., with Ortiz, (256) (Ent.)
Misra, B. G., with Jaswant Singh, Raghavan, Krishnaswamy & Radhagovinda Roy, 133 (Hel.)
——, with ——, Ray & Basu, 678, 907 (Mal.)
——, with ——, ——, —— & Bami, 193 (Mal.)
Misra, S. S., Gupta, B. M. & Hameed, S., 854 (Misc. Dis.)
Mitchell, R. B., with Love, Foulk & Williams, 378 (Mal.)
Mitchell, W. A., with Holway & Salah, 656 (Ent.)
Mitchener, A. V., 767 (Ent.)
Mitlin, N., with Gersdorff, 352 (Ent.)
——, with —— & Nelson, 574 (Ent.)
Mitra, R. D. & Mitra, S. D., (769) (Ent.)
Mitra, S. D., with Mitra, (769) (Ent.)
Mitri, S., with Gohar, El-Mofty, Eissa, Mousa, Sorour, Doss, Goma, Abou El-Wafa, El-Azhari & Ibrahim, 305 (Chl.)
Mitsuda, K., 1180 (B.R.)
Mitsui, Y., 247, 975 (Oph.)
Miyake, H. & Oike, K., 131 (Hel.)
Moçambique, 392 (Tryp.)
Mochtar, I. A., 792 (Mal.)
Mofty, A. M. & El-Saifi, M. F., (309) (Am.)
Moggridge, J. Y., 200 (Tryp.)
Mohammed, A. H. & El Karemi, M., 555 (Vms.)
Mohammed, A. S., 427 (Hel.)
Mohiuddin, A., 293 (Leish.)
Mohr, W., 793 (Mal.)
——, with Hoenig, 262 (Reports, etc.)
Molese, A. & Chieffi, G., 319 (Hel.)
Molina, A., (940) (Am.)
Mollaret, L., with Bourgain & Chambry, 815 (R.F.)
Møller-Christensen, V., Bakke, S. N., Melsom, R. S. & Waaler, E., 424 (Lep.)
Monbrun, A., 560 (Oph.)
Mondal, A., with Chaudhuri, Ghosal & Chakravarty, 810 (Chl.)
——, with Das, Ghosal & Gupta, 810 (Chl.)
Mongelli Sciannameo, N., 635 (Hel.)
Montalenti, G., with Bianco, Silvestroni & Siniscalco, 438 (Haem.)
Montanari, A., 475 (Mal.)
Monteiro, E. L., with de Macedo & Brandão, 209 (Typh.)
Montel, L. R., 34 (Lep.)
Montel, M. L. R., 423 (Lep.)
Montestruc, E., (764) (Prot.), (868) (Reports, etc.)
——, Blache, R. & Martin de Mirandol, P., 811 (Am.)
——, with Gernez-Rieux & Tacquet, 33, 315 (Lep.)
Montezin, G., with Ganzin, Rebeyrotte & Macheboeuf, 93 (Tryp.)
——, with Schneider & Biheu, 483 (Mal.)
Montoya, J. A., 22 (Typh.)
——, with Cabrera M. & McAnally, 697 (Typh.)
Montoya, R. & Pesce, H., 723 (Lep.)
Moore, A. M., with Thompson, Reinertson & Bayles, 603, 912 (Mal.)
Moore, B., with Marmion, Stoker, McCoy & Malloch, 501 (Typh.)
Moore, D. V., with Bueding, Peters & Koletsky, 533 (Hel.)
——, Thillet, C. J., Carney, D. M. & Meleney, H. E., 954 (Hel.)
Moore, G. D., with Dicke & Hilsenhoff, 258, (769) (Ent.)
Moore, J., with Schmidt, Hughes, Schmidt, Ackermann, Hoffmann & Weiland, 481 (Mal.)
Moore, S., with Reagan, Day, Kehne & Brueckner, 506 (Rab.)
Moores, H., 1115 (Mal.)
Mooser, H., 500 (Typh.)
Moreira, M., with Lobo & de Oliveira, 128 (Hel.)

Moretti, G. F., with Bonnin & Leproux, 79 (Mal.)
Morgan, R. J., Shackelford, P. O. & Lamb, J. H., 1073 (Der.)
Moriya, S., with Inoki & Kobayashi, 504 (Den.)
Morley, J. S., (135) *bis* (Hel.)
Mornet, P., 1026 (Tryp.)
Morril, A. W., Jr., 1083 (Ent.)
Morrison, F. D., with Campau & Baker, 1096 (Ent.)
Morton, L. T., 1113 (B.R.)
Moscovici, C., with Babudieri, 24 (Typh.)
Moulanier, M. & Diouf, J., 915 (Tryp.)
de Moura, A., with Azulay & Mourão, 721 (Lep.)
Mourant, A. E., with Chalmers & Ikin, 965 (Haem.)
——, with Dreyfuss, Ikin & Lehmann, 144 (Haem.)
Mourão, G., with Azulay & de Moura, 721 (Lep.)
Moursund, M. P., with Fink & VanderPloeg, 758 (Der.)
Mousa, A. H., with Gohar, El-Mofty, Eissa, Sorour, Doss, Goma, Abou El-Wafa, El-Azhari, Mitri & Ibrahim, 305 (Chl.)
Mozley, A., 321 (Hel.)
Mozumder, U. K., with Dunlop, 645 (Haem.)
Mugrage, E. R., with Florio & Miller, 403 (Den.)
Muhleisen, J. P., 827 (Hel.)
Mühlpfordt, H., 455 (Prot.)
Muirhead-Thomson, R. C. & Mercier, E. C., 275 376 (Mal.)
Mukerjee, N., with Dharmendra & Chatterji, 721 (Lep.)
Mukerji, S. K., 238 (Def. Dis.)
Mukherjee, N., 314 (Lep.)
——, with Dharmendra, 314 (Lep.)
Mulet, M., with le Gac, 689 (Tryp.)
Müller, F., 348 (Prot.)
Müller, G., 829 (Hel.)
Mulligan, H. W., 607 (Tryp.)
Muñoz Rivas, G., (218) (Am.)
Muraz, 15 (Tryp.)
Murray, A. G., with Ainley, Curd, Hepworth & Vasey, (395) (Tryp.)
Murray, E. S., with Chang & Snyder, 613 (Typh.)
Muterel, A., with Barbier & Rumpf, (352) (Ent.)
de Muyncke, A., with Thys, Courtois, Vanbreuseghem, Baker, Bertrand, Limbos & Verselder, 444 (Der.)
Myatt, A. V., with Coatney, Hernandez, Jeffery & Cooper, 85 (Mal.)

N

Nabholtz, M., with Gallais, Cardaire, Planques, Pruvost & Cros, 552 (Haem.)
Naffah, N., with Brounst, 831 (Hel.)
Nair, C. P., with Jaswant Singh, Ray & Basu, 10, 185, 281 (Mal.)
Nájera, L. E., 359 (B.R.), (403) (Y.F.), (455) (Prot.)
Nakabayasi, T., with Inoki, Kitaura & Kurogochi, 394 (Tryp.)
——, with —— & Takada, 1137 (Am.)
Nakahashi, Y., with Sasa, (350) (Ent.)
Nakamura, M., 113 *bis* (Am.)
——, Hrenoff, A. K. & Anderson, H. H., 708 (Am.)
—— & James, M. B., 611 (Tryp.)
Náquira, F., Tagle, I. & Neghme, A., 535 (Hel.)
Náquira V., F., Zipper A., J. & Neghme R., A., 1157 (Hel.)
Naqvi, S. H., (352) (Ent.)
Narayanan, E. K. & Menon, P. S., 26 (Chl.)
Nash, R., with Busvine, 1176 (Ent.)
Nash, T. A. M. & Page, W. A., 1124 (Tryp.)
Nasir-ud-Din, M., 97 (Leish.), 250 (Ent.)
Nataf, R., 590 (B.R.)
Nauck, E. G., 904 (Mal.)
Naumann, P., 228 (Hel.)
Navaranne, P., with Blanc, 938 (Am.)
Navarranne, P., Paris, P. & Camain, R., 1079 (Misc. Dis.)
Navarro, L., with Bordas & Downs, 376 (Mal.)
Naveau, P. P., with Meyer, 503 (Typh.)
Neel, J. V., Itano, H. A. & Lawrence, J. S., 845 (Haem.)
——, Kaplan, E. & Zuelzer, W. W., 1161 (Haem.)
——, with —— & ——, 1161 (Haem.)
——, Schull, W. J. & Shapiro, H. S., (145) (Haem.)
Neghme, A., Albi, H. & Gutiérrez, J., 927 (Y.F.)
——, with Náquira & Tagle, 535 (Hel.)
——, Silva, R. & Alvarez, M., 512 (Am.)
Neghme R., A., with Néquira V. & Zipper A., 1157 (Hel.)
—— & Silva C., R., 133 (Hel.)
Negroni, P., Briz de Negroni, C., Daglio, C. A., Vivancos, C. & Bonatti, A., 441 (Der.)
Nelson, J., with Appelbaum & Greenberg, 404 (Rab.)
Nelson, J. W., 146 (Der.), 839 (Def. Dis.)
Nelson, R. H., with Gersdorff & Mitlin, 574 (Ent.)
Němec, R. & Micka, F., (636) (Hel.)
Neto, V. A., with Meira & Nobrega, (348) (Prot.)
Nettel F., R., 135, 234 *bis*, 326 *bis*, 546 (Hel.)
Netto, M. B., with Pereira, 824 (Hel.)
Neuda, P. M., 144 (Haem.)
Neufeld, O. E., (142) (Sp.)
Neuhaus, W., (734) (Hel.)
Neujean, G. & Evens, F., 15 (Tryp.)
——, with Schoenaers & Evens, 1023 (Tryp.)
Neves, H. de A. & Scaff, L. M., 1158 (Hel.)
Neves, J. A., with Bogliolo, 969 (Der.)
Newcomer, V. D., with Tarbet & Wright, 244 (Der.)
Newton, W. L., 224 (Hel.)
—— & Haskins, W. T., 1061 (Hel.)
——, with Jones, 632 (Hel.)
Nguyen Dinh Cat, 246 *bis*, 976 (Oph.)
Nicholas, W. L., with Hopkins, 1069 (Hel.)
——, Kershaw, W. E., Keay, R. W. J. & Zahra, A., 748 (Hel.)
Nicholls, M., with Williams, 654 (Ent.)
Nichols, E., Rindge, M. E. & Russell, G. G., 1034 (Typh.)
Nicol, B. M., 550 (Def. Dis.), 1006 (Mal.)
Nicoli, R. M., (70), (659) (Ent.)
Nielsen, A. T., with Nielsen, 859 (Ent.)
Nielsen, E. T. & Nielsen, A. T., 859 (Ent.)
Nigeria, 486 (Tryp.)
Nikolić, N., 770 (Ent.)
Nikolitsch, M., 212, 1133 (Rab.)
Niles, W. J., with Jayewickreme, 52 (Hel.)
Niño, F. L. & Ferrada Urzúa, L., 442 (Der.)
Nishimiya, H., with Komiya, Yokogawa, Chichijo, Suguro & Yamaoka, 633, 1063 (Hel.)
Nishimura, S., with Tanimura, 820 (Lep.)
——, with —— & Kono, 820 (Lep.)

N'Koa, A., with Le Gac & Sauermann, 631 (Hel.)
Noad, K. B. & Haymaker, W., 920 (Typh.)
Noble, E. R., with McRary & Beaver, 918 (Tryp.)
Noble, K., with Garber & Carouso, 933 (Pl.)
Nobrega, P., with Meira & Neto, (348) (Prot.)
Noel, R., with Marie-Suzanne & Sohier, 1150 (Lep.)
Noger, C., with Vermeil, Tournoux, Tocheport & Schmitt, 725 (Hel.)
Nolan, M. O., Bond, H. W. & Mann, E. R., 1061 (Hel.)
Nor El Din, G. & El Tamimi, M., 541 (Hel.)
——, with Tadros, 529 (Hel.)
Norman, T., 279 (Mal.)
de Noronha, C., 715 (Ys.)
Norris, E. W., Schneider, L. B., Hanchett, L. J., Kohler, C. E. & Buren, W. F., 1135 (Pl.)
Noury, M., 397 (Typh.)
Nowicki, E. L., 117 (Am.)
Nuñez Andrade, R., 521 (Lep.)
Nyberg, W., 534 (Hel.)

O

Oakley, C. L. & Trevan, D. J., 85 (Mal.)
Obez, A., with Coutelen, Biguet & Lefrançois, 140 (Hel.)
Ogawa, Y., with Ishii, 320 (Hel.)
Oike, K., Asoda, Y. & Sirakawa, T., 322 (Hel.)
——, with Miyake, 131 (Hel.)
Okamoto, J., with Yanai, 115 (Am.)
Okuno, Y., with Taniguchi & Kawamura, 852 (Oph.)
Olansky, S., with Edmundson & Lopez Rico, 942 (Ys.)
Oldroyd, H., (70) (Ent.)
Oleksiak, R. E., with Bumbalo & Gustina, 838 (Hel.)
Olenev, N. O., 163 *bis* (Ent.)
de Oliveira, A. P., with da Fonseca, Passalacqua, de Lima & Lacerda, (692) (Tryp.)
Oliveira, B. S., Jr., with Planet, Carvalho & Mauri, 724 *bis* (Lep.)
de Oliveira, J. E., with Lobo & Moreira, 128 (Hel.)
Oliver-González, J., 632, 839 (Hel.)
—— & Dobal, J. M., 939 (Am.)
——, with Pérez-Santiago & Thillet, 1066 (Hel.)
——, with Rodríguez-Molina, 535 (Hel.)
Olivier, L., 226 (Hel.)
—— & Schneidermann, M., 732 (Hel.)
——, Vaughn, C. M. & Hendricks, J. R., 39 (Hel.)
Olmos Castro, N., 122 (Lep.)
Omi, G., with Zaiman & Gapinski, 963 (Hel.)
Omori, N. & Fujii, S., 1171 (Ent.)
Onabamiro, S. D., 54, 235 (Hel.)
Onul, B. & Uysalefe, D., 502 (Typh.)
Onwumere, R. E., with Jelliffe, 1121 (Mal.)
Openshaw, H. T., with Battersby & Wood, (1046) (Am.)
Oppenoorth, F. J., with Dresden, 464 (Ent.)
Ordman, D., 929 (Rab.)
Ormerod, W. E., 292 (Tryp.)
O'Rourke, F. J., 474 (Mal.)
Orris, L. & Combes, F. C., 42 (Hel.)
Ortiz, I., (256) (Ent.)
—— & Mirsa, M., (256) (Ent.)
Ortiz Mariotte, C., 696 (Typh.)
Osbond, J. M., (309) (Am.)
Osimani, J. J., 1156 (Hel.)
——, Migliaro, E. F. & Abella, C. M., 736 (Hel.)
——, with Talice, Veríssimo & Franca, 490 (Tryp.)
Otori, Y., with Hunter & Ritchie, 226 (Hel.)
Otten, E., 855 (Prot.)
Otto, G. F., with Jachowski, 50 (Hel.)
——, Jachowski, L. A., Jr. & Wharton, J. D., 832 (Hel.)
Otto, H., 762 (Prot.)
Ottolina, C., 531 (Hel.)
Ouedraogo, Y., with Charmot, le Henand, Mathieu & Sylla, 118 (Am.)
Ovazza & Taufflieb, 464 (Ent.)
Van Oye, E., 1071 (Haem.)
—— & Charles, P., 58 *bis* (Def. Dis.)
Özsan, K., with Golem, 110 (Pl.)

P

Packchanian, A., (490), 612 (Tryp.)
——, with Anigstein, 501 (Typh.)
Paderski, B., 1059 (Hel.)
Page, W. A., with Nash, 1124 (Tryp.)
Pakistan J. of Health, 191 (Mal.)
Pallister, R. A., (141) (Def. Dis.)
Palm, G., with Westphal, 346 (Prot.)
Pampana, E. J., 279 (Mal.)
Pan, C., with Hunter, Freytag, Ritchie, Yokogawa & Potts, 129 (Hel.)
——, with Ritchie, Hunter, Yokogawa & Szewczak, 525 (Hel.)
Panier, E., with Jadin, 1034 (Typh.)
De Paola, G. & Mastrandrea, G., 1068 (Hel.)
Paoletti, A., 809 (Chl.)
Pappas, G. D. & Ruppel, R. F., 673 (Mal.)
Paraense, W. L., 799 (Mal.)
—— & Santos, J. M., (1060) (Hel.)
Pardo-Castelló, V., with Gonzales Prendes, Fors Carbonell & Curbelo Hernandez, 1142 (Lep.)
Paredes, M., with Ruiz-Sánchez, Quezada, Casillas & Riebeling, 380 (Mal.)
Parent, M. & Massardo-Raymaekers, 1159 (Def. Dis.)
—— & Verbruggen, J., 527 (Hel.)
Paris, P., with Navarranne & Camain, 1079 (Misc. Dis.)
Parker, F. S. & Irvin, J. L., (278) *bis* (Mal.)
Parker, R. R., Bell, J. F., Chalgren, W. S., Thrailkill, F. B. & McKee, M. T., 399 (Typh.)
Parreira, F., with Pinto & Franco, 800 (Tryp.)
——, with Trincão, Franco & Gouveia, 93 (Tryp.)
——, with ——, Gouveia & Franco, 646 (Haem.), 685, 686 (Tryp.)
Parrot, L., (1097) (Ent.)
—— & Donatien, A., 98 (Leish.)
—— & Durand-Delacre, R., (575) (Ent.)
Parsons, H. E., 148 (Oph.)
Parvais, with Crosnier, Giraud & Darbon, (600) (Mal.)
Pascher, F. & Keen, R., with Simm, F., 145 (Haem.)
De Pasquale, N. & Quattrocchi, G., 1066 (Hel.)
Pasqualino, A., 430 (Hel.)
Passalacqua, C. S. P., with da Fonseca, de Lima, de Oliveira & Lacerda, (692) (Tryp.)
Passmore, R., 650 (Misc. Dis.)
Pastor Botija, F., (378) (Mal.)
Patel, J. C., 625 (Am.)

Paterson, P. Y., with Ley, Diercks, Smadel, Wisseman & Traub, 207 (Typh.)
——, with ——, Smadel & Diercks, 208 (Typh.)
Patterson, J. C., with Weinstein, Duman & Trelawny, 1062 (Hel.)
Patterson, J. L., Jr., with Heyman & Duke, (61) (Haem.)
Patwardhan, V. N., with Venkatachalam, 830 (Hel.)
——, with Vijayaraghavan, 239 (Def. Dis.)
Paul, B. M., with Ghosal, 511 (Chl.)
Paul, H., 126 (Lep.)
Paul, K., with Frank, 230 (Hel.)
Paulini, E., 1117 (Mal.)
Paulley, J. W., 329 (Sp.)
Payet, M. & Camain, R., 318 (Hel.)
Payzin, S. & Akkay, N., 103 (Typh.)
Peel, E., with van Hoof & Chardome, 184 (Mal.)
——, Mestdagh, M. & Mathieu, J., 5 (Mal.)
Peeters, E., with Vincke, 796 (Mal.)
Pelc, S. R., with Kuper, 484 (Mal.)
Pellegrini, D., 303 (Rab.), (323) (Hel.)
Pellegrino, J., 696 (Leish.)
—— & Brener, Z., 493 *ter* (Tryp.)
——, with Dias, Pinto & de Castro, 611 (Tryp.)
——, with Laranja, Dias & Duarte, 610 (Tryp.)
Péllissier, A. & Trinquier, E., 108 *bis* (Rab.)
Peñalver, L. M., 224 (Hel.)
Pennek, J., 722 (Lep.)
Perego, C., with Berti, Ziti, Rzeppa, Rieckmann & Rapp, 425, (723) (Lep.)
Pereira, H. G. & Travassos, J., 615 (Typh.)
Pereira, M. B., with Hellmeister, 821 (Hel.)
Pereira, O. A. & Netto, M. B., 824 (Hel.)
Perez Gallardo, F., Clavero, G. & Hernandez, S., 924 (Typh.)
——, —— & Valle, E., 698 (Typh.)
——, with —— & ——, 923 (Typh.)
Perez-Pina, F., Hartney, J. B. & Zimmerman, S. L., (377) (Mal.)
Pérez-Santiago, E., Oliver-González, J. & Thillet, C. J., 1066 (Hel.)
Perri, A. M., with LaBoccetta, Israel & Sigel, 805 (Typh.)
Perrini, F., 600 (Mal.)
Pesce, H., with Montoya, 723 (Lep.)
Pessoa, S. B., 1059 (Hel.)
——, with de Almeida & Covello, 1140 (Ys.)
—— & de Freitas, J. L. P., 396 (Tryp.)
Pestre, A., with Mandoul, 904 (Mal.)
Peter, H., with Siegert, Simrock & Schweinsberg, 925 (Typh.)
Peters, D., with Weyer, 297 (Typh.)
—— & Wigand, R., 701 (Bart.)
——, with ——, 105, (701) (Bart.)
Peters, L., with Bueding, Koletsky & Moore, 533 (Hel.)
Peterson, D. G., 162 (Ent.)
Petrishcheva, P. A. *et al.*, 695 (Leish.)
—— & Gubar', V. V., 694 (Leish.)
Petrus, E., with Levitan, Durand & Jacobs, 517 (Ys.)
Pfister, R., (325) (Hel.), 1114 (B.R.)
——, with Jonchere, 325 (Hel.)
——, with —— & Ridet, 299 (Typh.)
Philip, C. B., 299 (Typh.)
Phillips, B. P., 1043 (Am.)
——, with Luttermoser, 27 (Am.)
Phillips, P. G. & Kenney, R. A., 328 (Def. Dis.)
Phillips, W., with Garland, 1107 (B.R.)
Pick, F., (259) (Ent.)
——, with Garnham, 285 (Mal.)
Pickens, E. G., with Bell, 922 (Typh.)
Piédrola Gil, G. & Bravo Oliva, J., 213 (Rab.)
—— & Leria de la Rosa, M., 621 (Rab.)
Pieraerts, G., 16 (Tryp.)
Pierchon, M., with Camain, 438 (Def. Dis.)
Pierquin, L., with Himpe, 9 (Mal.)
Piers, F., 837 (Hel.)
Pieters, G., Vandepitte, J. & Van Wymeersch, H., (1072) (Haem.)
Pifano C., F. & Benaím Pinto, H., 201 (Tryp.)
—— & Marcuzzi, G., 202 (Tryp.)
——, Medina, R. & Anduze, P., 201 (Tryp.)
Pille, G., (278) (Mal.)
Pimentel, D., with Klock & Stenburg, (983) (Ent.)
——, Schwardt, H. H. & Dewey, J. E., 862 (Ent.)
Pinkerton, H., with Greiff, Chiga & Blumenthal, 399 (Typh.)
Pinto, A. R., 799 (Tryp.)
——, Parreira, F. & Franco, A., 800 (Tryp.)
—— & Roncon, R., 312 (Ys.)
——, with Tendeiro & Gomes, 815 (Am.)
Pinto, A. R. da C., 392, 395 (Tryp.)
Pinto, O. da S., 492, 495 (Tryp.)
—— & Bicalho, J. C., 494 (Tryp.)
——, —— & Guedes, A. da S., 491 (Tryp.)
——, with Coutinho & Barbosa, 694 (Tryp.)
——, with Dias, 495 (Tryp.)
——, with ——, Pellegrino & de Castro, 611 (Tryp.)
——, with Machado, 492 (Tryp.)
Piontkovskaya, S. P., 921 (Typh.)
Piquett, P. G., with Fales & Bodenstein, 167 (Ent.)
Pirajá da Silva, M. A., 1152 (Hel.)
Pires, C. D. de A., with Amaral, 826 (Hel.)
Pitchford, R. J., 727 (Hel.)
Pittendrigh, C. S., 276 *bis* (Mal.)
Pizzi P., T., 1130 (Tryp.)
—— & Prager S., R., 95 (Tryp.)
——, Rubio D., M., Prager S., R. & Silva C., R., 96 (Tryp.)
Planet, N., Oliveira, B. S., Jr., Carvalho, C. M. & Mauri, A. C., 724 *bis* (Lep.)
Planques, L., with Gallais, Cardaire, Pruvost, Cros & Nabholtz, 552 (Haem.)
Plas, E., 156 (Prot.)
Pletsch, D. J., with Chow & Liang, 475 (Mal.)
Plowright, W., with Burdin, 489 (Tryp.)
Poetschke, G., (14) (Mal.)
Poindexter, H. A., 985 (Reports, etc.)
Poirier, M., with Deschiens, 764 (Prot.)
Pollitzer, R., 111, 304, 405 (Pl.), 508 (Chl.)
——, with Swaroop, 407 (Chl.)
Polunin, I., 969 (Der.)
Ponseti, I. V. & Baird, W. A., 342 (Misc. Dis.)
Poole, J. B., 56 (Hel.)
Porges, N., 847 (Vms.)
Portier, A., Massonnat, J. & Zevaco, P., 845 (Haem.)
Portnoy, J., Galvez, R. & Cutler, J. C., 315 (Lep.)
Postel, R., with Lemaire, Camain, Leduc & Ehrhard, 968 (Vms.)
Potenza, L., Irazábal, J. & Barnola D., J., (336) (Haem.)
Potts, D. E., with Hunter, Freytag, Ritchie, Pan & Yokogawa, 129 (Hel.)
Potts, W. H., 1022 (Tryp.)

Poul, J., with Donatien & Rampon, (931), 1037 (Rab.)
Powell, R. E., 444 (Der.)
Powers, D., with Manwell & Alpert, 604 (Mal.)
Prager S., R., with Pizzi P., 95 (Tryp.)
—— with ——, Rubio D. & Silva C., 95 (Tryp.)
Pray, E. G., 349 (Prot.)
Price, E. R., with Fredrickson, Willett & Smith, 704 (Rab.)
Price, J. L., 486 (Tryp.)
Price, W. H., 615, 1035 (Typh.)
Prieto Lorenzo, A., 1015 (Mal.)
——, with Aparicio Garrido, 1110 (B.R.)
Prieur, M., with Launoy, 1028 (Tryp.)
Di Primio, R., 1002 (Mal.)
Prine, J. H., with Darrow & Gingrich, 385 (Mal.)
Pringle, G., 575 (Ent.)
Prost, M. T., with Blanc, 1056, 1057 (Lep.)
Provost, M. W., 252 (Ent.)
Pruitt, F. W., with Cleve, 947 (Lep.)
Pruvost, A., with Gallais, Cardaire, Planques, Cros & Nabholtz, 552 (Haem.)
Public Health Rep., 164 (Ent.), 749 (Hel.)
Purandare, N. M., 1045 (Am.)
——, Bhende, Y. M., Figueredo, N. & Desai, S. D., 497 (Leish.)

Q

Quagliato, R., with Bechelli, 1055 (Lep.)
Qualls, D. M., with Eny, 32 (Ys.)
Quan, S. F., with Cavanaugh, 931 (Pl.)
Quarterman, K. D., with Kilpatrick, 350 (Ent.)
——, with Maier, Baker, Bogue & Kilpatrick, 350 (Ent.)
—— & Mathis, W., 351 (Ent.)
——, with ——, 766 (Ent.)
——, with Braganca, 338 (Vms.)
Quattrocchi, G., with de Pasquale, 1066 (Hel.)
Quesnel, J. J., with Bück & Courdurier, 602 (Mal.)
——, with Courdurier & Bück, 301 (Typh.)
Quezada, M., with Ruiz-Sánchez, Paredes, Casillas & Riebeling, 380 (Mal.)
Quinby, G. E. & Schubert, J. H., 614 (Typh.)
——, with Welch, 6 (Mal.)
Quiogue, E. S., 57 (Def. Dis.)
Qutubuddin, M., 462 (Ent.)

R

Raccuglia, G., 454 (Prot.)
Rachou, R. G., 796 (Mal.)
—— & Borba, A. M., 82 (Mal.)
—— & Deane, L. M., 538 (Hel.)
—— & Ferraz, D. M., 159 (Ent.)
Racoillet, R., with Bidart, 974 (Oph.)
Radford, C. D., 465 (Ent.)
Radhagovinda Roy, with Jaswant Singh, Raghavan, Misra & Krishnaswamy, 133 (Hel.)
Radhakrishna Rao, M. V., with Govindan, 964 (Def. Dis.)
Radke, R. A., 216 (Am.)
Radkowiak, J., with Kryński, 206 (Typh.)
Raffaele, G., 80, 476, 477 (Mal.)
Raffi, A., with Combe, 1005 *bis* (Mal.)
Rafi, S. M., 381, 1012 (Mal.)
Ragab, M. M., (320) (Hel.)
Rageau, J. & Adam, J. P., 653 (Ent.)
—— & Vervent, G., (659) (Ent.)
Raghavan, M., with Raman & Guha, 1017 (Mal.)
Raghavan, N. G. S., with Jaswant Singh, 831 (Hel.)
——, with ——, Misra, Krishnaswamy & Radhagovinda Roy, 133 (Hel.)
Rahman Ansari, M. A. & Shah, K. S., 66 (Ent.)
Rajindar Pal, Sharma, M. I. D., Krishnamurthy, B. S. & Kashyap, S. P., 480 (Mal.)
Ramakrishnan, S. P., 1016 (Mal.)
——, with Jaswant Singh, Krishnaswami, Satya Prakash & Ray, 1015 (Mal.)
——, with —— & Ray, 193 (Mal.)
——, with ——, Satya Prakash, Krishnaswami, Ray, Krishnan & David, 194 (Mal.)
——, Krishnaswami & Satya Prakash, 90 (Mal.)
——, Satya Prakash & Krishnaswami, A. K., 90 (Mal.)
——, with —— & ——, 797 (Mal.)
Ramalingaswami, V., Sriramachari, S. & Tulpule, P. G., 59 (Def. Dis.)
Raman, K., Raghavan, M. & Guha, P. C., 1017 (Mal.)
Ramanarao, P. V., 816 (Ys.)
Ramanujam, K., 1145 (Lep.)
Ramos, A. da S., 801 (Tryp.)
——, Lacerda, J. H. de M., Brando, N. N. & Sampaio, A. H., (1028) (Tryp.)
——, with Schiavi & de Lima, 1028 (Tryp.)
Rampon, R., with Donatien & Poul, (931), 1037 (Rab.)
Ramsay, J. A., (1168) (Ent.)
Ranta, L. E. & McCreery, P. M., 1137 (Chl.)
Rao, K. A., (45) (Hel.)
Rao, T. R., with Viswanathan & Bhatia, 673 (Mal.)
Rao, V. V., 999 (Mal.)
Raper, A. B., 562 (Misc. Dis.)
——, with Ross, Haddow & Trowell, 618 (Y.F.)
Rapp, O. P., with Berti, Ziti, Perego, Rzeppa & Rieckmann, 425, (723) (Lep.)
Rasmussen, I. M., with Rogers, Brown & Heal, (984) (Ent.)
Raspa, G., with Zaffino, 438 (Hel.)
Rassi, E., with Convit, Canto Rodriguez & Contreras, 421 (Lep.)
——, with —— & Gonzáles, 121 (Lep.)
Ravaioli, L., with Babudieri, 23 (Typh.)
Ravisse, P., 645 (Haem.), 955 (Hel.)
Ray, A. P., Basu, P. C. & Jaswant Singh, 683 (Mal.)
——, with Jaswant Singh & Basu, 386, 683 (Mal.)
——, with ——, —— & Misra, 678, 907 (Mal.)
——, with ——, —— & Nair, 185, 281 (Mal.)
——, with ——, Krishnaswami, Satya Prakash & Ramakrishnan, 1015 (Mal.)
——, with ——, Misra, Basu & Bami, 193 (Mal.)
——, with ——, Nair & Basu, 10 (Mal.)
——, with —— & Ramakrishnan, 193 (Mal.)
——, with ——, ——, Satya Prakash, Krishnaswami, Krishnan & David, 194 (Mal.)
Raychaudhury, P. K., with De & Bhattacharyya, 214 (Chl.)
Raynal, J. H., (24) (Y.F.), (278) (Mal.)
Read, C. P., (228) (Hel.)
Reagan, R. L. & Brueckner, A. L., 25, 212 (Den.)
——, Day, W. C. & Brueckner, A. L., 404 (Rab.)
——, ——, Moore, S., Kehne, E. F. & Brueckner, A. L., 506 (Rab.)

Rebell, G., with Lamb, Kelly, Shackelford & Koons, 646 (Der.)
Rebello, A., with Foy, Kondi & Martins, 61 (Haem.)
Rebeyrotte, P., with Ganzin, Macheboeuf & Montezin, 93 (Tryp.)
Reboredo, A., with Spies, Stone, Suarez, Garcia-Lopez & Lopez-Toca, 755 (Haem.)
Reed, F. S., 182 (Mal.)
Rees, R. J. W., with Goulding & Robson, 524 (Lep.)
Reeves, W. C., 860 (Ent.)
——, with Bellamy, 459 (Ent.)
Reichenow, von E., 1109 (B.R.)
Reid, H. A., 21 (Leish.)
Reid, J. A., 434 (Hel.), 791 (Mal.)
Rein, C. R., 311, (628) (Ys.)
Reinertson, J. W., with Thompson, 235 (Hel.)
——, with ——, Bayles & Moore, 603 (Mal.)
——, with ——, Moore & Bayles, 912 (Mal.)
——, with Weston, Thompson, Fisken & Reutner, (641) (Hel.)
Remington, J. W., with Witham & Lombard, (1073) (Vms.)
Remlinger, P. & Bailly, J., 404, 703 (Rab.)
——, —— & Hadji, A., 1037 (Rab.)
Rempel, J. G., with Fredeen, Spinks, Anderson & Arnason, 575 (Ent.)
Remy, F., 976 (Oph.)
Rénier, J. C., with Lièvre, (846) (Haem.)
Renjifo, S. & de Zulueta, J., 7 (Mal.)
Repass, R. P., 571 (Ent.)
Rés, J. F., with Cambournac & Roque, 1139 (R.F.)
Reul, R., with Bouckaert, 72 (Reports, etc.)
Reuter, S., with Ascher, 1087 (Ent.)
Reutner, T. F., with Weston, Thompson, Reinertson & Fisken, (641) (Hel.)
Reynaud, R., with Jonchère & Gomer, 1024 (Tryp.)
Reynier, C., with Auffret, 595 (Mal.)
Rhodes, K., with Hill, Stafford & Aub, 329 (Def. Dis.)
Rhodesia, Northern, (487) (Tryp.)
Rhodesia, Southern, Dept. of Health, 580 (Reports, etc.)
Ribeiro, H. M., 820 (Hel.)
Ribeiro, V. de M., 526 (Hel.)
Ricci, M., 327 (Hel.), 511, 936 (Am.)
—— & Menna, F., 725 (Hel.)
Richard, C., with Brygoo, 344 (Misc. Dis.)
Richeson, E. M., Highman, B., Greenberg, J. & Coatney, G. R., 682 (Mal.)
Richou, M., 188 (Mal.)
Ridet, J., with Jonchère & Pfister, 299 (Typh.)
Riebeling, R., with Ruiz-Sánchez, Quezada, Paredes & Casillas, 380 (Mal.)
Rieckmann, B. H. G., with Berti, Ziti, Perego, Rzeppa & Rapp, 425, (723) (Lep.)
Riedel, H., 530 (Hel.)
Rieger, H., 158 (Prot.)
Rigdon, R. H., Micks, D. W. & Breslin, D., 386 (Mal.)
Rimington, C., with Fulton, 1015 (Mal.)
Rimington, R. A., with Elyan, 553 (Haem.)
Rindge, M. E., with Nichols & Russell, 1034 (Typh.)
Rioux, J. A., (597) (Mal.)
Risi, J. B., Fonte, J. & Rossas, T. P., 723 (Lep.)
Rispoli, J. A., with Manso Soto, (1129) (Tryp.)
Ritchie, L. S., with Hunter & Freytag, 321 (Hel.)
——, with ——, ——, Pan, Yokogawa & Potts, 129 (Hel.)
——, with —— & Otori, 226 (Hel.)
——, Hunter, G. W., Pan, C., Yokogawa, M. & Szewczak, J. T., 525 (Hel.)
Rivera, A., with Tierkel, Arbona & de Juan, 303 (Rab.)
Rivosecchi, L., (770), (1174) (Ent.)
——, with Sacca, (770) (Ent.)
Rizzotti, G., 308, 310, 410, 512 (Am.), 341, 342 (Misc. Dis.), 536 (Hel.)
Roach, G. G., with Elsdon-Dew & Freedman, 417 (Am.)
Roadhouse, L. A. O., with Kasman & Wright, 1168 (Ent.)
Robayna Galvan, G., 998 (Mal.)
Robertson, A. S., 260 (Reports, etc.)
Robertson, G. H., (535) (Hel.)
Robertson, G. I., Davey, D. G. & Fairley, N. H., 186 (Mal.)
——, with Thomas & Davey, 1120 (Mal.)
Robic, J., with McCrumb, Mercier, Bouillat, Smadel, Woodward & Goodner, 933 (Pl.)
Robinson, R. G., (1066) (Hel.)
Robson, J. M., with Goulding & Rees, 524 (Lep.)
Roch, M. & Lasserre, R., 712 (Am.)
Da Rocha, F. J. & Roedel, G., 1155 (Hel.)
Rock, R. E., 716 (Ys.)
Rockenbach, J., with Seneca & Kane, 120 (Am.)
de Rodaniche, E. C., 302 (Y.F.), 1132 (Typh.)
Rodenwaldt, E., 772 (B.R.)
Rodger, F. C., 148 (Oph.)
Rodhain, J., 497 (Leish.), 913 (Mal.)
—— & Andrianne, V. F., 605 (Mal.)
——, with Wanson, (1070) (Hel.)
Rodrigues, P. M. & Travassos, J., 206 (Typh.)
Rodríguez, C. & Adrianza H., M., 217 (Am.)
Rodriguez M., J. D., 576 (Ent.), (972) (Der.)
Rodriguez-Molina, R., 133 (Hel.)
—— & Oliver-González, J., 535 (Hel.)
——, with Romero & Vizcarrondo, 143 (Sp.)
Roedel, G., with da Rocha, 1155 (Hel.)
Roger, F., with Giroud & Gaillard, 921 (Typh.)
Rogers, E. F., Brown, H. D., Rasmussen, I. M. & Heal, R. E., (984) (Ent.)
Rogers, J. & Adamson, D. G., 1050 (Lep.)
Rogers, K. B., 323 (Hel.)
Rogers, L., 306 (Chl.), 819 (Lep.)
—— & Megaw, J. W. D., with McRobert, G. R., 262 (B.R.)
Rojas, E., with Báez Villaseñor, Ruiloba, Treviño & Campillo S., (497) (Leish.)
Rojas, G., with Donoso I., Amenábar C. & Zacarías G., 512 (Am.)
Rollo, I. M., 85, 92 (Mal.)
——, with Hitchings, Maggiolo, Russell & VanderWerff, (87) (Mal.)
——, with Williamson, 92 (Tryp.)
Roman, E., 571 (Ent.)
Romaña, C., 1131 *bis* (Tryp.)
——, Briones, S. & Scheffels, E. L., 1129 (Tryp.)
—— & Toranzos, L. B., 1130 (Tryp.)
——, Vasvari, J. & Rothe, A., 1130 (Tryp.)
Romano, S. & Iannuzzi, B., 294 (Leish.)
Romberg, R. G., 1068 (Hel.)
Romeo, J. M., with Jiménez Díaz & Marina, 842 (Sp.)

Romeo, V., 595 (Mal.)
Romero, C. A., Vizcarrondo, R. & Rodriguez-Molina, R., 143 (Sp.)
Roncon, R., with Pinto, 312 (Ys.)
Roque, R. de A., with Cambournac & Rés, 1139 (R.F.)
Rosemberg, J., Souza Campos, N. & Aun, J. N., 420, 722 (Lep.)
——, with de Souza Lima, Souza Campos & Aun, 1053 (Lep.)
Rosenberg, F., with Aquilina & Wuertz, (23) (Typh.)
Rosenblum, M. J., Masland, R. L. & Harrell, G. T., 103 (Typh.)
Rosenfeld, M. H., with Zaher, Isenberg & Schatz, 569 (Prot.)
Rosenthal, F. D., 329 (Sp.)
Ross, H. & Gemar, F., 1143 (Lep.)
Ross, J. A., Kershaw, W. E. & Kurowski, A. C., 634 (Hel.)
Ross, R. W., Haddow, A. J., Raper, A. B. & Trowell, H. C., 618 (Y.F.)
Ross, W. F., with Gelfand, 956 *bis* (Hel.)
Rossas, T. P., with Risi & Fonte, 723 (Lep.)
Rost, E. C., with Anspaugh & Cleary, (757) (Haem.)
Rotberg, A., 203 (Leish.), 1052 (Lep.)
Roth, A. R. & Hoffman, R. A., 573 (Ent.)
——, Lindquist, A. W. & Terriere, L. C., 861 (Ent.)
Roth, H. P., with Dowdell & Shumway, 711 (Am.)
Roth, J., 1154 (Hel.)
Rothe, A., with Romaña & Vasvari, 1130 (Tryp.)
Rothe, H., 248 (Ulc.)
Rothschild, M., with Hopkins, 1183 (B.R.)
Roubaud, E., 14, 94 (Tryp.), (66) (Ent.)
—— & Ghelelovitch, S., 801 (Tryp.)
Roux, J., with Carrère, 1039 (Chl.)
Roy, A. T., 34 (Lep.)
Rozeboom, L. E., 1116 (Mal.)
Rubel, J., with Zaiman, 963 (Hel.)
Rubenow, R., with Gefel, 1048 (R.F.)
Rubio, D. M., with Pizzi, P., Prager, S. & Silva, C., 95 (Tryp.)
Ruiloba, J., with Báez Villaseñor, Rojas, Treviño & Campillo S., (497) (Leish.)
Ruiz-Sánchez, F., Quezada, M., Paredes, M., Casillas, J. & Riebeling, R., 380 (Mal.)
Rumpf, P., with Barbier & Muterel, (352) (Ent.)
Rupp, H., 287 (Tryp.)
——, with Jadin & Fain, 189 (Mal.)
Ruppel, R. F., with Pappas, 673 (Mal.)
Russell, G. G., with Nicholas & Rindge, 1034 (Typh.)
Russell, P. B., with Hitchings, Maggiolo, Vander-Werff & Rollo, (87) (Mal.)
Russell, P. F., 1178 (B.R.)
——, with Covell & Swellengrebel, 996 (Mal.)
Russell, S. R., with French, (648) (Der.)
Ryan, J. W., with Smith, (579) (Ent.)
Ryckman, R. E. & Arakawa, K. Y., 375 (Mal.)
Rzeppa, H. W., with Berti, Ziti, Perego, Rieckmann & Rapp, 425, (723) (Lep.)

S

Saavedra, J., with Jarpa, Martini & González, (534) (Hel.)
Sabater, J., with Suárez, Suárez & Buso, 143 (Sp.)
Sabin, A. B., 1080 (Prot.)
——, Eichenwald, H., Feldman, H. A. & Jacobs, L., 567 (Prot.)
Sabrosky, C. W., 257, 983 (Ent.)
Sacca, G., 1088 (Ent.)
—— & Rivosecchi, L., (770) (Ent.)
Saccharin, H., with Casile, 740 (Hel.)
Sachs, S. B., 841 (Def. Dis.)
Sacktor, B., (162), (463) (Ent.)
Sadun, E. H., with Carrera, 412 (Am.)
——, with —— & Faust, 309 (Am.)
——, with Everritt & Carrera, 937 (Am.)
——, Krupp, I. M. & Everritt, M. G., 307 (Am.)
—— & Vajrasthira, S., 635 (Hel.)
Sáenz Vera, C., 506 (Pl.)
Saggese, S., 962 (Hel.)
Sagher, F., (1050) (Lep.)
——, with Dostrovsky & Zuckerman, 803 (Leish.)
——, Kocsard, E. & Liban, E., 421 (Lep.)
Saif, M., with Halawani, Abdallah & Dawood, 428 (Hel.)
Saigon (Vietnam): Institut Pasteur de Saigon, 1104 (Reports, etc.)
Saint-Etienne, J., with Ceccaldi & Audebaud, (928) (Rab.)
Saito, K., with Yaoi, Takei, Maeda & Yamasawa, 623 (Rab.)
Saito, M., 115 (Am.)
Sakihara, H., (978) (Misc. Dis.)
Salah, A. A., with Holway & Mitchell, 656 (Ent.)
Saleh, A., with Abou-el-Naga, 128 (Hel.)
Salgado, A. de A., 491 (Tryp.)
Saliternik, Z., 1008 (Mal.)
Salvesen, H. A., 843 (Sp.)
Salvin, S. B., with Burke & Gerloff, 339 (Der.)
Salzmann, S., with Ferro-Luzzi, 548 (Def. Dis.)
Sampaio, A. H., with Ramos, Lacerda & Brando, (1028) (Tryp.)
Sandovalc, A., with Treviñov, 1064 (Hel.)
Sangiorgi, M., with Scaffidi, 514 (Am.)
Santos, J. M., with Paraense, (1060) (Hel.)
Santos, R. M., with Dias & Brant, 494 (Tryp.)
Sanyal, N. N., with Sen Gupta, Bhattacharyya & Das, 97 (Leish.)
Sanyal, P. K., with Bhaduri, 1069 (Hel.)
Sapero, J. J., with Strode, Whayne, Williams & Snyder, 467 (Reports, etc.)
Sarandria, J. L., with Wertman, 298 (Typh.)
Sarkies, J. W. R., 340 (Oph.)
——, with Edington, 242 (Haem.)
Sarles, M. P. & Vandegrift, W. B., (168) (Ent.)
Sarrouy, C., Cabannès, R., Sendra, L. & Zevaco, P., 439 (Haem.)
Sasa, M., Hayashi, S., Kano, R., Sato, K., Komine, I. & Ishii, S., 741 (Hel.)
——, with Jameson, (865) (Ent.)
—— & Nakahashi, Y., (350) (Ent.)
Satchell, G. H. & Harrison, R. A., 718 (Ys.)
Sato, K., with Sasa, Hayashi, Kano, Komine & Ishii, 741 (Hel.)
Sato, Y. & Arakawa, T., 142 (Def. Dis.)
——, with Yoshida, 841 (Def. Dis.)
Satya Prakash, with Jaswant Singh, Krishnaswami, Ray & Ramakrishnan, 1015 (Mal.)
——, with ——, Ramakrishnan, Krishnaswami, Ray, Krishnan & David, 194 (Mal.)
——, Krishnaswami, A. K. & Ramakrishnan, S. P., 797 (Mal.)

Satya Prakash, with Ramakrishnan & Krishnaswami, 90 *bis* (Mal.)
Sauermann, M., with Le Gac & N'Koa, 631 (Hel.)
Saugrain, J., (212) (Rab.)
Scaff, L. M., with Neves, 1158 (Hel.)
Scaffidi, V. & Sangiorgi, M., 514 (Am.)
—— & Scaletta, S., 307 (Am.)
Scaletta, S., with Scaffidi, 307 (Am.)
Schaberg, A. & Straub, M., 644 (Def. Dis.)
Schack, J. A., with Vesell, 318 (Hel.)
Schadewaldt, H., 954 (Hel.)
Schatz, A., with Zaher, Isenberg & Rosenfeld, 569 (Prot.)
Scheffels, E. L., with Romaña & Briones, 1129 (Tryp.)
de Scheitz, L. & van Hoye, R., 688 (Tryp.)
Schiavi, A., De Lima, A. R. & Ramos, A. da S., 1028 (Tryp.)
Schmid, E. E. & Thillainathan, P., 818 (Lep.)
Schmidt, I. G., with Schmidt, Hughes, Ackermann, Hoffmann, Moore & Weiland, 481 (Mal.)
Schmidt, L. H. & Genther, C. S., with Fradkin, R., Helm, H. & Weiland, J., 480 (Mal.)
——, Hughes, H. B. & Schmidt, I. G., with Ackermann, R., Hoffmann, R., Moore, J. & Weiland, J., 481 (Mal.)
Schmidtke, L., with Kunert, 855 (Prot.)
Schmitt, P., with Vermeil, Tournoux, Tocheport & Noger, 725 (Hel.)
Schneider, J. & Dupoux, R., 415 (Am.)
——, Montézin, G. & Biheu, O., 483 (Mal.)
Schneider, K., 519 (Lep.)
Schneider, L. B., with Norris, Hanchett, Kohler & Buren, 1135 (Pl.)
Schneidermann, M., with Olivier, 732 (Hel.)
Schobinger von Schowingen, R., 232 (Hel.)
Schoenaers, F., Neujean, G. & Evens, F., 1023 (Tryp.)
Schofield, F. D., with Knyvett, 997 (Mal.)
Scholten, C., 139 (Hel.)
Schoof, H. F., Siverly, R. E. & Jensen, J. A., 257 (Ent.)
Schöttler, W. H. A., 338 (Vms.)
Schubert, J. H., with Quinby, 614 (Typh.)
Schujman, S., 521 (Lep.)
Schulert, A. R. & Lewis, H. B., 249 (Misc. Dis.)
Schull, W. J., with Neel & Shapiro, (145) (Haem.)
Schultz, W. & Bauer, H., 456 (Prot.)
Schulze, F., Sweetman, H. L. & Spear, P. J., (466) (Ent.)
Schwardt, H. H., with Goodwin, 863 (Ent.)
——, with Pimentel & Dewey, 862 (Ent.)
Schwartz, B., 749 (Hel.)
Schwartz, R., with Dean, 550 (Def. Dis.)
Schwarz, E., with Amberson, 1067 (Hel.)
Schwarz, J. & Baum, G. L., 647 (Der.)
Schweinsberg, H., with Siegert, Peter & Simrock, 925 (Typh.)
——, with —— & Simrock, 401 (Typh.)
Schwetz, J., 38, 429, (1062) (Hel.)
Schwiegk, H., 357 (B.R.)
Schwink, T. M., with Becker, 603 (Mal.)
Scott, J. A. & Macdonald, E. M., 743 (Hel.)
——, with ——, 743 (Hel.)
Scott, R. A., Johnson, R.E. & Holzman, D., 141 (Hel.)
Scott, R. B., with Banks & Simmons, 334 (Haem.)
Seaman, G. R., 1130 (Tryp.)
Segesman, J. K., with Dykes & Birsner, 557 (Der.)
Seitz, E., 428 (Hel.)
Seitz, K., 828 (Hel.)
Selin, M. J., with Grundmann & Butler, (1157) (Hel.)
Selkon, J. M. & Latham, W. J., (235) (Hel.)
Selle, W. A., 1184 (B.R.)
Sellers, T. F., with Starr & Sunkes, 109 (Rab.)
Sen, N., with Dharmendra & Chatterjee, 34 (Lep.)
Sen, P., 314 (Lep.)
Sendra, L., with Sarrouy, Cabannès & Zevaco, 439 (Haem.)
Seneca, H. & Ides, D., 651, 856 (Prot.)
——, Kane, J. H. & Rockenbach, J., 120 (Am.)
Sen Gupta, C. M., with Basu & Menon, (1097) (Ent.)
Sen Gupta, P. C., 96 (Leish.)
—— & Adhikari, S. L., 498 (Leish.)
—— & Bhattacharjee, B., 1030 (Leish.)
——, Bhattacharyya, B., Das, A. K. & Sanyal, N. N., 97 (Leish.)
Sen Gupta, P. N., (141) (Def. Dis.)
Senior White, R. A., 598 (Mal.)
——, Lewis, G. & Lee, P., 674 (Mal.)
Serfling, R. E., 349 (Ent.)
Sergent, Ed., 168 (Lab.), 259, 657 (Ent.), 359 (B.R.), 1103 (Reports, etc.)
—— & Sergent, Et., 485 (Mal.)
Sergent, Et., with Sergent, 485 (Mal.)
Serrano, A. de M., 395 (Tryp.)
Sexton, R. C., Jr., Eyles, D. E. & Dillman, R. E., 979 (Prot.)
Shackelford, P. O., with Lamb, Kelly, Rebell & Koons, 646 (Der.)
——, with Morgan & Lamb, 1073 (Der.)
Shaffer, J. G., 112 (Am.)
—— & Sienkiewicz, H. S., 113 (Am.)
Shah, K. S., with Rahman Ansari, 66 (Ent.)
Shah, S. N., with Gadgil, 317 (Hel.)
Shakir, M. H., (319) (Hel.)
Shalom, E., 648 (Oph.)
Shamir-Zernik, R., with Guggenheim, (792) (Mal.)
Shaper, A. G., 1101 (Lab.)
Shapiro, H. S., with Neel & Schull, (145) (Haem.)
Sharma, M. I. D., with Rajindar Pal, Krishnamurthy & Kashyap, 480 (Mal.)
Sharvill, D., 969 (Der.)
Shaw, H. M. & Hughes, E. S., (27) (Am.)
Shawarby, A. A., 1174 (Ent.)
Sheedy, J. A., with Hunter, 277 (Mal.)
Shelley, W. B., 968 (Der.)
Sheppard, R. L., 1 (*T.D.B.*)
Shibata, S., 904 (Mal.)
Shinozaki, T. & Hashimoto, N., 537 (Hel.)
Shiomi, T., with Hotta, 25 (Den.)
Shmueli, D., with Yonis, (966) (Haem.)
Shookhoff, H. B., with Hussey & Sterman, 228 (Hel.)
Shrivastava, D. L., with Dudani, Iyer & Krishna Murti, 510 (Chl.)
Shumway, N. P., with Dowdell & Roth, 711 (Am.)
Shute, P. G., 85, 184 (Mal.)
——, with Covell & Maryon, 795, 1118 (Mal.)
Sidky, M., with Hammouda, 57 (Def. Dis.)
Siegert, R., Peter, H., Simrock, W. & Schweinsberg, H., 925 (Typh.)
——, Simrock, W. & Schweinsberg, H., 401 (Typh.)
Sienkiewicz, H. S., with Shaffer, 113 (Am.)
Sifre, R. J., 644 (Sp.)

Sigel, M. M., with LaBoccetta, Israel & Perri, 805 (Typh.)
Siim, J. C., 347 (Prot.)
Sikorska, S., with Kozar & Wysocka, 346 (Prot.)
Silc, M., with Stergar & Kocijančič, (978) (Prot.)
Siler, J. F., 984 (Reports, etc.)
Silk, E., with Lehmann, 168 (Lab.)
Sillans, R., (964) (Def. Dis.)
D'Silva, C. B., 1037 (Rab.)
Silva C., R., with Neghme, R., 133 (Hel.)
——, with Pizzi P., Rubio D. & Prager S., 95 (Tryp.)
Da Silva, G. M., (1153) (Hel.)
——, with Barbosa, 1153 (Hel.)
Silva, R., with Neghme & Alvarez, 512 (Am.)
da Silva, T. L. & Unti, O., 691 (Tryp.)
——, with ——, 692 (Tryp.)
Silva, Y. P., 100 (Leish.)
Silva-Goytia, R. & Elizondo, A., 500, 697 (Typh.)
Silva Junior, M., (440) (Vms.)
Silverman, L., with Silverman, 1089 (Ent.)
Silverman, P. H. & Silverman, L., 1089 (Ent.)
Silvestroni, E. & Bianco, I., 333 (Haem.)
——, with ——, Montalenti & Siniscalco, 438 (Haem.)
Simm, F., with Pascher & Keen, 145 (Haem.)
Simmons, J., with Banks & Scott, 334 (Haem.)
Simões, A., 318 (Hel.)
Simons, R. D. G. Ph., 362 (B.R.)
Simrock, W., with Siegert, Peter & Schweinsberg, 925 (Typh.)
——, with —— & Schweinsberg, 401 (Typh.)
Singer, I., 679 (Mal.)
——, with Gilles, (602) (Mal.)
Singer, K. & Fisher, B., 335, 551, 1160 (Haem.)
Singh, I., 1017 (Bl.)
Singh, S., 565 (Prot.)
Siniscalco, M., with Bianco, Montalenti & Silvestroni, 438 (Haem.)
Sinsheimer, R. L. & Koerner, J. F., (146) (Vms.)
Sioli, H., 1060 (Hel.)
Sippell, W. L. & Brown, A. W. A., 571 (Ent.)
Siqués E., G., with Badínez, 117 (Am.)
Sirakawa, T., with Oike & Asoda, 322 (Hel.)
Sircar, P., with Bhattacharjee, (813) (Am.)
Sircus, W., with Clarke, 56 (Def. Dis.)
Siverly, R. E., with Schoof & Jensen, 257 (Ent.)
Sklavounou, S., with Choremis, Zervos, Constantinides & Zannos, 241 (Haem.)
Slavin, G., 617 (Typh.)
Sloan, S. & Freedman, T., 938 (Am.)
Smadel, J. E., Ley, H. L., Jr., Diercks, F. H. & Cameron, J. A. P., 207 (Typh.)
——, with ——, —— & Paterson, 208 (Typh.)
——, with ——, ——, ——, Wisseman & Traub, 207 (Typh.)
——, with McCrumb, Mercier, Robic, Bouillat, Woodward & Goodner, 933 (Pl.)
de Smet, R., 381 (Mal.)
Smit, R. J., with le Riche, Kinnear, Loewenthal & Boshoff, 548 (Def. Dis.)
Smith, A., (24) (Y.F.)
Smith, A. G. & Harrison, R. A., 161 (Ent.)
Smith, A. L., with Gill, 55 (Hel.)
Smith, C. S., with Eyles & Jones, 1042 (Am.)
Smith, D., 85 (Mal.)
Smith, D. A., with McGregor, 57 (Def. Dis.)
——, with —— & Hawking, 232 (Hel.)
Smith, E. W. & Conley, C. L., 1160 (Haem.)
Smith, F. E., with Ellis & Underwood, 1077 (Heat Str.)
——, with Evans, 398 (Typh.)
Smith, G. F., with Gjullin & Isaak, 1087 (Ent.)
Smith, H. M., with Smith, (173) (Reports, etc.)
Smith, J. E., with Fredrickson, Willett & Price, 704 (Rab.)
Smith, P. W. & Smith, H. M., (173) (Reports, etc.)
Smith, W. T. & Larsen, E., 476 (Mal.)
Smith, W. T., Jr. & Ryan, J. W., (579) (Ent.)
Smith-White, S., (66) (Ent.)
Smitskamp, H., 28 (Am.)
Snapper, I., 804 (Leish.)
Snow, D., with Catchpole, 43 (Hel.)
Snyder, J. C., with Chang & Murray, 613 (Typh.)
——, with Strode, Whayne, Williams & Sapero, 467 (Reports, etc.)
Soap, (772) (Ent.)
Sodeman, W. A., with Hood & Akenhead, 215 (Am.)
Soeparmo, H. T. & Stoker, W. J., 382 (Mal.)
van Soest, J. H. & van Thiel, P. H., 80 (Mal.)
Sohier, R., with Floch, 422 (Lep.)
——, with Marie-Suzanne & Noel, 1150 (Lep.)
Van Someren, E. C. C., with Lumsden, 858 (Ent.)
Sommerman, K. M., 858 (Ent.)
—— & Foote, R. H., 858 (Ent.), 1116 (Mal.)
Sommers, S. C., with Hollander, 219 (Lep.)
Soo-Hoo, G., 237 (Hel.)
Soper, F. L., 910 (Mal.)
Sorour, A., with Gohar, El-Mofty, Eissa, Mousa, Doss, Goma, Abou El-Wafa, El-Azhari, Mitri & Ibrahim, 305 (Chl.)
Sorsby, A., with Burkinshaw & Kirman, 568 (Prot.)
——, Ungar, J. & Crick, R. P., 1077 (Oph.)
Sosnina, E. F., 627 (R.F.)
South Pacific Commission, 63 (Oph.), 419 (Lep.), 1000 (Mal.)
Souza, R. de P., Ferraz, N. de T. & Bechelli, L. M., 1055 (Lep.)
de Souza-Araujo, H. C., 419, 1056 (Lep.)
——, with Cardoso, R. A. de A., (522) (Lep.)
Souza Campos, N., with Rosemberg & Aun, 420, 722 (Lep.)
——, with de Souza Lima, Rosemberg & Aun, 1053 (Lep.)
De Souza Lima, L., Souza Campos, N., Rosemberg, J. & Aun, J. A., 1053 (Lep.)
Soyer, R., with Ferrand, 974 (Oph.)
Soyka, O. & Jírovec, O., 158 (Prot.)
——, with ——, Zázvorka & Voldřich, 856, (982) (Prot.)
Spadaro, O., 563 (Misc. Dis.)
Spaet, T. H., 551 (Haem.)
Spear, P. J., with Schulze & Sweetman, (466) (Ent.)
Spencer, H., with Abbott, 957 (Hel.)
Spies, T. D., Stone, R. E., Suarez, R. M., Garcia-Lopez, G., Lopez-Toca, R. & Reboredo, A., 755 (Haem.)
Spingarn, C. L. & Edelman, M. H., 27 (Am.)
Spinks, J. W. T., with Fredeen, Anderson, Arnason & Rempel, 575 (Ent.)
Spiotta, E., with Weiser & Ekman, 1044 (Am.)
Spoehr, A., with Stewart, 515 (Ys.)
Spooner, D. F., with Fulton, (309) (Am.)
Sprent, J. F. A., 45 (Hel.)

Srinivas, K. S., Guha, S. S. & Guha, P. C., (378) (Mal.)
Sriramachari, S., with Ramalingaswami & Tulpule, 59 (Def. Dis.)
Srivastava, R. S., 1013 (Mal.)
—— & Chand, D., 280 (Mal.)
Stafford, J. L., with Hill, Rhodes & Aub, 329 (Def. Dis.)
Stage, H. H., Gjullin, C. M. & Yates, W. W., 655 (Ent.)
Stahler, N., with Terzian & Miller, 797 (Mal.)
Stahnke, H. L., 555 (Vms.)
Standen, O. D., 732 (Hel.)
Stanier, M. W., 840 (Def. Dis.)
Stannus, H. S., 329 (Sp.)
Stapleton, T. K., with Goodwin, 13 (Mal.)
Starr, L. E., Sellers, T. F. & Sunkes, E. J., 109 (Rab.)
Steel, W. S., (487) (Tryp.)
Steele, J. H., 749 (Hel.)
Steen, E. & Kåss, E., 249 (Prot.)
van Steenis, P. B., 117, 1047 (Am.)
Steinitz, E., with Alkan & Freudenthal, 343 (Misc. Dis.)
Stenburg, R. L., with Klock & Pimentel, (983) (Ent.)
Stergar, S., 246 (Oph.)
——, Kocijančič, K. & Šilc, M., (978) (Prot.)
Sterman, M. M., with Hussey & Shookhoff, 228 (Hel.)
Sternburg, J., Vinson, E. B. & Kearns, C. W., 1173 (Ent.)
Stevenson, G. F., with Sunderman, MacFate, MacFadyen & Copeland, (965) (Haem.)
Stewart, H., 329 (Sp.)
Stewart, I., 1138 (Am.)
Stewart, T. D. & Spoehr, A., 515 (Ys.)
Steyn, D. G. & Venter, I. D., 453 (Misc. Dis.)
Stijns, J. & Delville, J. P., 756 (Haem.)
Stiles, G. W. & Cleland, W. S., (1174) (Ent.)
Stirewalt, M. A. & Evans, A. S., 223, 533 (Hel.)
Stitnimankarn, T., with Viranuvatti & Tansurat, 1064 (Hel.)
Stitt, P. G. & Levine, M., 1080 (Prot.)
Stoffberg, N., with de Meillon & Lurie, 631 (Hel.)
——, with Kisner & de Meillon, 733 (Hel.)
——, with Lurie, de Meillon & Eiselen, 729 (Hel.)
Stoker, M. G. P., with Malloch, 400 (Typh.)
——, with Marmion, McCoy, Malloch & Moore, 501 (Typh.)
—— & Thompson, J. F., 299 (Typh.)
Stoker, W. J., with Soeparmo H. T., 382 (Mal.)
Stone, A., 658 (Ent.)
Stone, R. E., with Spies, Suarez, Garcia-Lopez, Lopez-Toca & Reboredo, 755 (Haem.)
Stonehill, R. B., with Braun, (413) (Am.)
Stoner, R. D. & Hale, W. M., 56 (Hel.)
Stones, P. B., 436 (Hel.)
Strahan, J. H., with Field, Edeson & Wilson, 1120 (Mal.)
——, with Leong, 551 (Def. Dis.)
Strandtmann, R. W. & Eben, D. J., 919 (Typh.)
Straub, M., with Schaberg, 644 (Def. Dis.)
Strode, G. K., Whayne, T. F., Williams, L. L., Jr., Sapero, J. J. & Snyder, J. C., 467 (Reports, etc.)
Stryjecka-Ustupska, A., 525 (Hel.)
Stunkard, H. W., (826) (Hel.)
—— & Hinchliffe, M. C., 42, 1062 (Hel.)
Suárez, R. M., Sabater, J., Suárez, R. M., Jr. & Buso, R., 143 (Sp.)
——, with Spies, Stone, Garcia-Lopez, Lopez-Toca & Reboredo, 755 (Haem.)
Suárez, R. M., Jr., with Suárez, Sabater & Buso, 143 (Sp.)
Subramaniam, R., 28 (Am.)
—— & Vaid, B. K., 677 (Mal.)
Sudd, J. H., (72) (Ent.)
Suguro, T., with Komiya, Yokogawa, Chichijo, Nishimiya & Yamaoka, 633, 1063 (Hel.)
Sumiyoshi, K., with Tanaka & Kagioka, 932 (Pl.)
Sunderman, F. W., MacFate, R. P., MacFadyen, D. A., Stevenson, G. F. & Copeland, B. E., (965) (Haem.)
Sunkes, E. J., with Starr & Sellers, 109 (Rab.)
Sureau, P., with Floch, 35, 222, 424 (Lep.), 1032 (Leish.)
——, with —— & Lecuiller, 221, 316, 424 (Lep.)
Sussman, O., 749 (Hel.)
Suzue, K., Ichida, F. & Imagawa, G., 33 (Lep.)
Suzuki, K., with Yamamoto, 805 (Typh.)
Swanston, C., 63 (Oph.)
Swaroop, S., with Pollitzer, R., 407 (Chl.)
Swartzwelder, C., 215 (Am.)
Sweetman, H. L., with Schulze & Spear, (466) (Ent.)
Swellengrebel, N. H., with Covell & Russell, 996 (Mal.)
Sylla, with Charmot, le Henand, Mathieu & Ouedraogo, 118 (Am.)
Symétain, 1185 (B.R.)
Szewczak, J. T., with Ritchie, Hunter, Pan & Yokogawa, 525 (Hel.)

T

Tacquet, A., with Gernez-Rieux & Montestruc, 33, 315 (Lep.)
Tadros, W. & Nor El-Din, G., 529 (Hel.)
Tager, M., (648) (Der.)
Tagle, I., with Náquira & Neghme, 535 (Hel.)
Tahori, A. S. & Hoskins, W. M., (1174) (Ent.)
Tähti, E., 534 (Hel.)
Takada, S., with Inoki & Nakabayasi, 1137 (Am.)
Takeda, Y., with Yoshie, Koshiro & Hattori, 819 (Lep.)
Takei, M., with Yaoi & Maeda, 109, 622 (Rab.)
——, with ——, ——, Saito & Yamasawa, 623 (Rab.)
Takemori, N., Henmi, M. & Kitaoka, M., 614 (Typh.)
—— & Kitaoka, M., 397 (Typh.)
Takeyama, O., 636 *bis* (Hel.)
Talice, R. V. & González-Ciapessoni, A., 70 (Ent.)
——, Veríssimo, S., Osimani, J. J. & Franca, M. E., 490 (Tryp.)
Talpis, L., with Michaelson & DeLamater, 1042 (Am.)
Tanaka, H., Sumiyoshi, K. & Kagioka, T., 932 (Pl.)
Tanganyika, 914 *bis* (Tryp.)
Taniguchi, T., Kawamura, R. & Okuno, Y., 852 (Oph.)
Tanimura, S. & Hine, S., 655 (Ent.)
Tanimura, T. & Nishimura, S., 820 (Lep.)
——, —— & Kono, M., 820 (Lep.)
Tan Kok Siang & Lie Kian Joe, (1067) (Hel.)

Tansurat, P., with Viranuvatti & Stitnimankarn, 1064 (Hel.)
Tarbet, J. E. & Breslau, A. M., 970 (Der.)
——, Wright, E. T. & Newcomer, V. D., 244 (Der.)
Tarun, D. W., with Knight, 28 (Am.)
Tasker, P. W. G., Whelan, J. F. P. & Cheek, E., 754 (Haem.)
Taufflieb, with Ovazza, 464 (Ent.)
Tavares, A., 1049 (Ys.)
Taylor, R. Y., 1006 (Mal.)
Taylor, W. H., 1056 (Lep.)
Tecce, N., 298 (Typh.)
——, with Gambardella, 1132 (Typh.)
Tello de la Peña, R. with Martinez Baez, 325 (Hel.)
Ten Berg, J. A. G., 53 (Hel.)
Tendeiro, J., (351), (579) (Ent.), 400 (Typh.), 505 (Rab.), 1127 (Tryp.), 1186 (B.R.)
—— & Pinto, A. R., with Gomes, F., 815 (Am.)
Terhaag, L., 923 (Typh.)
Terriere, L. C., with Roth & Lindquist, 861 (Ent.)
Terzian, L. A., Stahler, N. & Miller, H., 797 (Mal.)
Thackray, A. C., with Wilson, 557 (Der.)
Thaysen, E. H., with Helweg-Larsen, Hoffmeyer, Kieler, Thaysen, Thygesen & Wulff, 547 (Def. Dis.)
Thaysen, J. H., with Helweg-Larsen, Hoffmeyer, Kieler, Thaysen, Thygesen & Wulff, 547 (Def. Dis.)
Theodoulou, M., 1048 (R.F.)
Thevasagayam, E. S., with Chow, 1092 (Ent.)
van Thiel, P. H., with van Soest, 80 (Mal.)
Thiermann I., E. & Christen A., R., 495 (Tryp.)
Thillainathan, P., with Schmid, 818 (Lep.)
Thillet, C. J., with Moore, Carney & Meleney, 954 (Hel.)
——, with Pérez-Santiago & Oliver-González, 1066 (Hel.)
Thomas, A. K., 214 (Rab.)
Thomas, A. T. G., Robertson, G. I. & Davey, D. G., 1120 (Mal.)
Thomas, E. H., Bozicevich, J. & Hoyem, H. M., 750 (Hel.)
Thomas, M. E. M., 417 (Am.)
Thompson, J. F., with Stoker, 299 (Typh.)
Thompson, P. E., Moore, A. M., Reinertson, J. W. & Bayles, A., 912 (Mal.)
—— & Reinertson, J. W., 235 (Hel.)
——, ——, Bayles, A. & Moore, A. M., 603 (Mal.)
——, with Weston, Reinertson, Fisken & Reutner, (641) (Hel.)
Thompson, R. K., Whipp, A. A., Davis, D. L. & Batte, E. G., 1090 (Ent.)
Thomson, F. A., 433 (Hel.), 643 (Def. Dis.)
Thomson, M. L., with Adam, Ellis, Irwin & Weiner, 1163 (Heat Str.)
Thomson, T. J., with Ives, 564 (Misc. Dis.)
Thooris, G., with Beye, Kessel, Heuls & Bambridge, 738 (Hel.)
Thornburgh, D. B., Johnson, C. M. & Elton, N. W., 99 (Leish.)
Thrailkill, F. B., with Parker, Bell, Chalgren & McKee, 399 (Typh.)
Thurston, J. P., 912, 913, (1123) (Mal.)
Thygesen, P., with Helweg-Larsen, Hoffmeyer, Kieler, Thaysen, Thaysen & Wulff, 547 (Def. Dis.)
Thys, A., Courtois, G. & Vanbreuseghem, R., with Baker, D. H., Bertrand, M., de Muyncke, A., Limbos, P. & Verselder, R., 444 (Der.)
Tierkel, E. S., Arbona, G., Rivera, A. & de Juan, A., 303 (Rab.)
Tilden, I. L., (978) (Prot.)
Tischler, W., 1002 (Mal.)
Tisseuil, J., 1055 (Lep.)
Titman, W. L., with Harvey, 643 (Def. Dis.)
Titsworth, E. H., with Grunberg, 724 (Lep.)
Tobie, E. J. & Von Brand, T., 916 (Tryp.)
Tocheport, G., with Vermeil, Tournoux, Noger & Schmitt, 725 (Hel.)
Tola, A., with Garrido-Lecca, 930 (Rab.)
Tolentino, P., with Astaldi, 644 (Haem.)
Tomberg, V. & Lagrange, E., 958 (Hel.)
Topolnik, E., with Cvjetanović, Fališevac, Mihaljević, Kozmar & Vesenjak-Zmijanac, 1133 (Typh.)
Toranzos, L. B., with Romaña, 1130 (Tryp.)
Torrella, E., with Contreras, Guillen & Alcaraz, 424 (Lep.)
Torrella Gil, E., with Marco Ahuir & Alcaraz Garcia, 422 (Lep.)
Torres Muñoz, F., 1031 (Leish.)
Torres-Muñoz, N., with Bevier & Doria-Medina, 926 (Y.F.)
Toulant, P. & Boithias, M., 448, 850 (Oph.)
Toumanoff, C., (864) (Ent.)
Tournoux, P., with Vermeil, Tocheport, Noger & Schmitt, 725 (Hel.)
Touzin, R. & Merland, R., 316 (Lep.)
Townsend, T. E. & McKey, R. W., 1075 (Der.)
Trager, W., 195 (Mal.), 802 (Leish.)
Trans. Roy. Soc. Trop. Med. & Hyg., 85 (Mal.)
Trapido, H., 192 (Mal.)
——, with Carpenter & Galindo, 211 (Y.F.)
Traub, R., with Harrison, 1033 (Typh.)
——, with Ley, Diercks, Paterson, Smadel & Wisseman, 207 (Typh.)
Travassos, J., with Pereira, 615 (Typh.)
——, with Rodrigues, 206 (Typh.)
Travis, B. V., Applewhite, K. H., Frith, G. R. & Goldsmith, J. B., 860 (Ent.)
——, with Collins & Jamnback, 71 (Ent.)
Trelawny, G. S., with Weinstein, Duman & Patterson, 1062 (Hel.)
Trembley, H. L., 66 (Ent.)
Trespalacios, F., 220 (Lep.)
Trevan, D. J., with Oakley, 85 (Mal.)
Treviño, A., with Báez Villaseñor, Ruiloba, Rojas & Campillo S., (497) (Leish.)
Treviñov, A. & Sandovalc, A., 1064 (Hel.)
Trincão, C., Gouveia, E., Franco, A. & Parreira, F., 646 (Haem.), 685 (Tryp.)
——, Parreira, F., Franco, A. & Gouveia, E., 93 (Tryp.)
——, ——, Gouveia, E. & Franco, A., 686 (Tryp.)
Trinidad Govt., 88 (Mal.)
Trinquier, E., with Ceccaldi & Arnoult, 93, (610) (Tryp.)
——, with Péllissier, 108 *bis* (Rab.)
Tripodi, P. & Magnanelli, P., 28, 217 (Am.)
Trowell, H. C. & Davies, J. N. P., 141 (Def. Dis.)
——, —— & Dean, R. F. A., 141 (Def. Dis.)
——, with Ross, Haddow & Raper, 618 (Y.F.)
Tsuda, E., with Ishii, 129 (Hel.)
Tucker, W. H., 1045 (Am.)

Tulpule, P. G., with Ramalingaswami & Srirамachari, 59 (Def. Dis.)
Turner, F. C., with Kass, Andrus, Adams & Feldman, 157 (Prot.)

U

Uganda Protectorate, 200 (Tryp.)
Underwood, C. R., with Ellis & Smith, 1077 (Heat Str.)
Üner, R., 961 (Hel.)
Ungar, J., with Sorsby & Crick, 1077 (Oph.)
United Kingdom, 355 (B.R.)
Unsworth, K. & Chandler, R. L., (292) (Tryp.)
——, with Goodwin, (201) (Tryp.)
Unti, O., 1001 (Mal.)
—— & da Silva, T. L., 692 (Tryp.)
——, with ——, 691 (Tryp.)
Uysalefe, D., with Onul, 502 (Typh.)

V

Vachon, M., (243) (Vms.)
Vaid, B. K., with Subramanian, 677 (Mal.)
Vaisman, A., Hamelin, A. & Levaditi, C., 941 (R.F.)
——, with Levaditi & Hamelin, 219 *bis*, 310 (R.F.)
Vajrasthira, S., with Sadun, 635 (Hel.)
Valdés Díaz, R., with Kourí, 54 (Hel.)
Valentinčič, M., (1065) (Hel.)
Valle, E., with Clavero & Pérez Gallardo, 923 (Typh.)
——, with Pérez Gallardo & Clavero, 698 (Typh.)
Vanbreuseghem, R., 359 (B.R.)
——, with Thys, Courtois, Baker, Bertrand, de Muyncke, Limbos & Verselder, 444 (Der.)
—— & Wanson, M., 535 (Hel.)
Vandegrift, W. B., with Sarles, (168) (Ent.)
Vandepitte, J., with Pieters & van Wymeersch, (1072) (Haem.)
VanderPloeg, D. E., with Fink & Moursund, 758 (Der.)
VanderWerff, H., with Hitchings, Maggiolo, Russell & Rollo, (87) (Mal.)
Vaněk, J., 250 (Prot.)
Varela, G., González Rivera, M. & Barriga Vázquez, F., 517, 720 (Ys.)
Vargas, L., 135, (234) (Hel.), (252) *bis*, (256), (260) *bis* (Ent.)
—— & Bordas, E., 1178 (B.R.)
—— & Díaz Nájera, A., (256) *bis*, 256, (351) (Ent.)
—— & Downs, W. G., 252 (Ent.)
—— & Martínez Palacios, A., 1173 (Ent.)
Vargas, N. S., with Dayrit & Baltazar, 218 (Am.)
Vargues, R., 281 (Mal.)
—— & Fabiani, G., 680 (Mal.)
——, with —— & Fulchiron, 12 (Mal.)
——, with ——, Grellet, Fulchiron & Verain, (194), 283 (Mal.)
Vasey, C. H., with Ainley, Curd, Hepworth & Murray, (395) (Tryp.)
Vasvari, J., with Romaña & Rothe, 1130 (Tryp.)
Vaucel, M., (825) (Hel.)
—— *et al.*, 587 (B.R.)
Vaughn, C. M., with Olivier & Hendricks, 39 (Hel.)
Venkatachalam, P. S. & Patwardhan, V. N., 830 (Hel.)
Venter, I. D., with Steyn, 453 (Misc. Dis.)
Vérain, A., with Fabiani, 680 (Mal.)
——, with ——, Grellet, Vargues & Fulchiron, (194) (Mal.)
——, with ——, Vargues, Grellet & Fulchiron, 283 (Mal.)
Veratti, E., (928) (Rab.)
Verbruggen, J., with Parent, 527 (Hel.)
Vercammen-Grandjean, P. H., with Jadin, 771 (Ent.)
Verdier, P., with Huttel & Huttel, 768 (Ent.)
Verhaegen, P., 583 (Reports, etc.)
Veríssimo, S., with Talice, Osimani & Franca, 490 (Tryp.)
Vermeil, C., 68, (982), 1169 (Ent.)
—— & Maurin, J., 763 (Prot.)
——, Tournoux, P., Tocheport, G., Noger, C. & Schmitt, P., 725 (Hel.)
Verselder, R., with Thys, Courtois, Vanbreuseghem, Baker, Bertrand, de Muyncke & Limbos, 444 (Der.)
Vervent, G., with Rageau, (659) (Ent.)
Vesell, H. & Schack, J. A., 318 (Hel.)
Vesenjak-Zmijanac, J., with Cvjetanović, Fališevac, Mihaljević, Kozmar & Topolnik, 1133 (Typh.)
Veyret, D., with Diagne, Michel & Koite, 934 (Pl.)
Vialat, C., with Béquignon, (1038) (Rab.)
——, with —— & Guichard, 1134 (Rab.)
Vidal, A., with Zubiri & Mar Moñux, 950 (Lep.)
Viette, M., 523 (Lep.)
——, with Chaussinand & Krug, 523 (Lep.)
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